

CHAPTER III

PRESENT SITUATION OF THE DEVELOPMENT AREA



Hill of Tumiko

CHAPTER III. PRESENT SITUATION OF THE DEVELOPMENT AREA

1. Outline of Natural Conditions

1-1 Geography

The Development Area lies in the northern part of Veracruz State and has the length of about 120 km from north to south, 50 – 100 km from east to west, a total area about 8,300 km², nearly 12 percent of the total area of Veracruz State. As shown in Fig. III-1-(1), three rivers namely the Tuxpan, the Cazonas and the Tecolulla flow through the Area and pour into the Gulf of Mexico. Moreover a number of small rivers (drainages) exist between the rivers.

Topography of the Area is classified into following four areas.

(a) Lagoon

A number of lagoons exist in the coastal zone of the Area. Among these, such lagoons as Tamiahua and Tampamachoco are fairly large.

(b) Swamp

In the coastal zone particularly around the lagoons and rivers, swampy areas exist. But the percentage of swamp in the Area is very small.

(c) Coastal Plane

Coastal plane spreads near the coast. The width of this coastal plane in the Area, from the 100 m contour to the sea level ranges from 10 to 20 km.

(d) Mountain (Hill)

Mountainous area lies inland from the coastal plane. This zone occupies the largest part of the Area. Altitude of this area is as follows. North and northern-west boundary is about 300 – 500 m, southern-west boundary is about 200 m.

1-2 Climate

The climatic features of the Area are high temperature and humidity. Fig. III-1-(2) shows the temperature and precipitation contours. The temperature (annual average) of the Area is approximately 24 – 26°C excepting a mountainous zone in the north-western part, where the temperature is 22 – 24°C. Annual precipitation in the Area is 1,200 – 1,500 mm in the coastal zone (including Tuxpan), 900 – 1,200 mm in the central region (including Poza Rica), and 1,500 – 2,000 mm in the western parts.

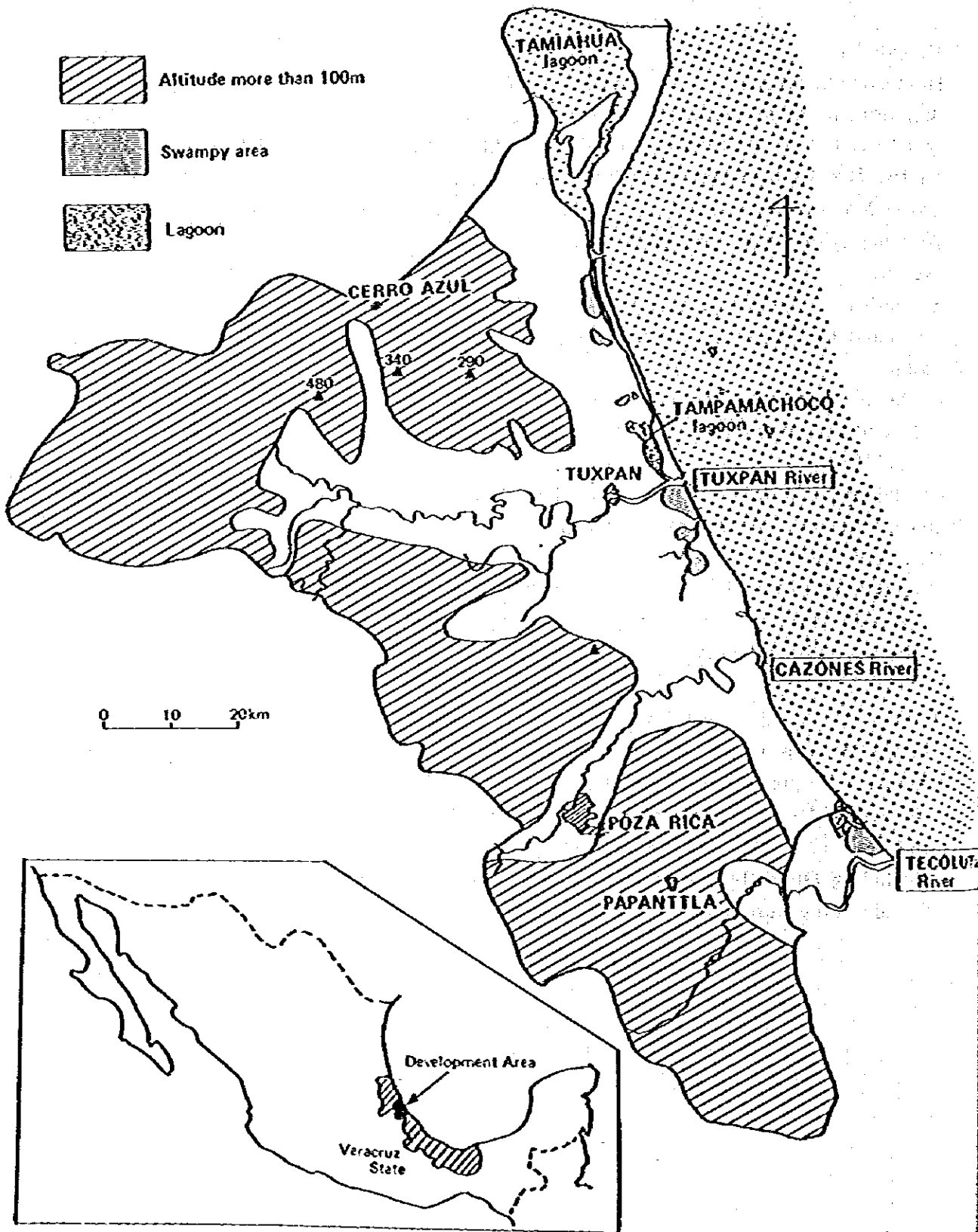


Fig. III-1-(1) Geography of Development Area

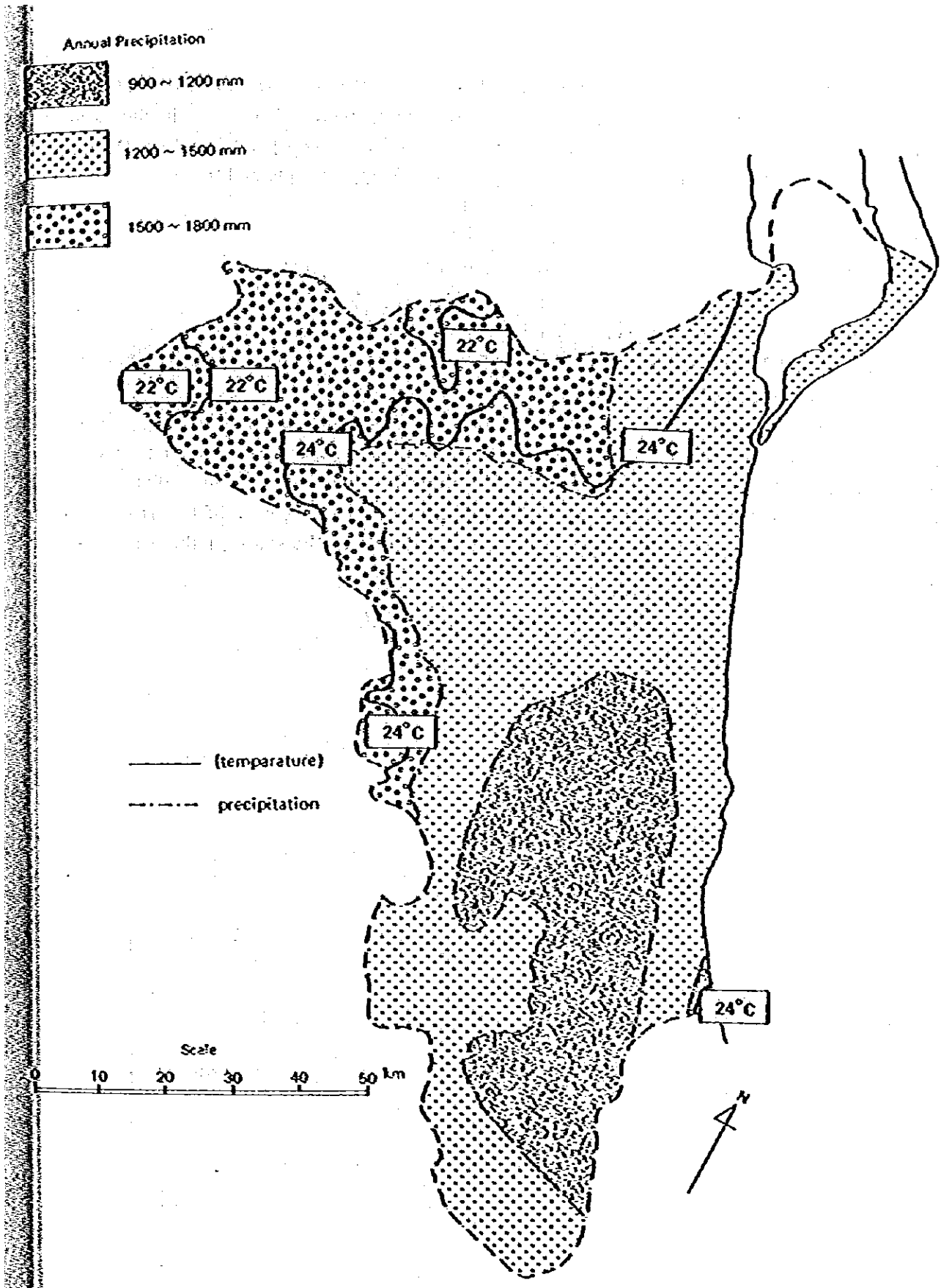


Fig. III-1-(2) Temperature and Precipitation of the Development Area

1-3 Geology

The geology of the Area was formed during the Cenozoic age as shown in Fig. III-1-(3). It was formed more recently as compared other areas. Sedimentary rock is distributed in the basin of the Tuxpan river, around Tumulco river and along coastal area. Old period geology (Miocenn, Oligocene, etc.) is found at high elevations and igneous rock appears here and there.

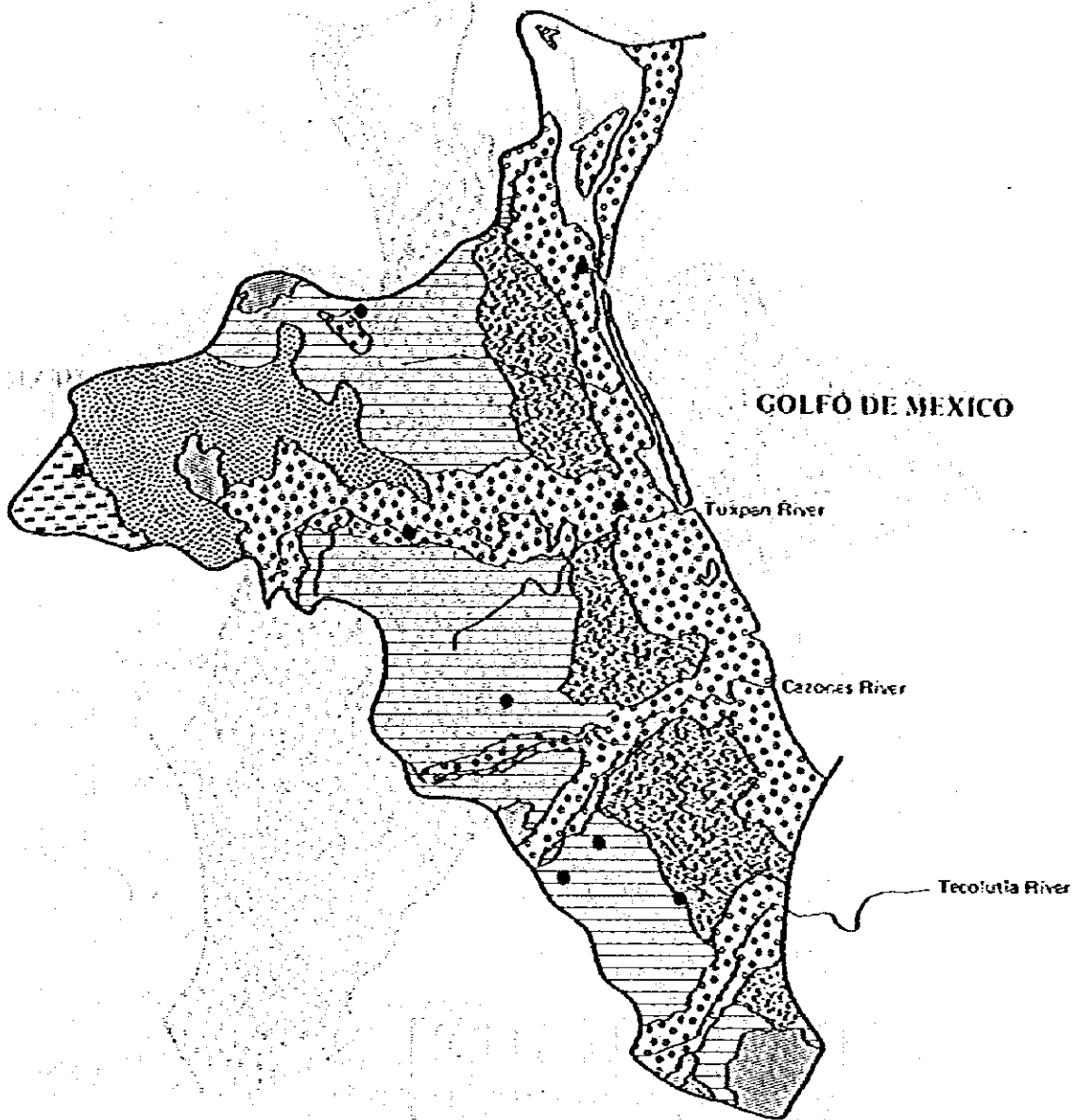
1-4 Soil

Soil distribution in the Area is shown in Fig. III-1-(4).

1-5 Geographical distribution of vegetation

Pasturage, thick silvas of perennial plants and temporary farm lands are the principal features of the Area. An outline of their distribution is shown in Fig. III-1-(5).

The temporary farm lands are distributed along the course and to the north of the Tuxpan river. Pasturage is distributed in the area between the Tuxpan and Cazonas rivers. The thick silvas of perennial plants and the temporary farm lands are intermixed in the area south of the Cazonas river. Besides, it is distinctive that mangroves are distributed in the estuary of the Tuxpan river and along Tampamachoco lagoon. Salt plants are distributed to the south of the Tuxpan river mouth.



				Sedimentary rock	Igneous rock (Effusive rock)
Cenozoic	Tertiary	Quaternary			
		Neogene	Pliocene	—	—
			Miocene		—
		Palaeogene	Oligocene		—
			Eocene		—
			Palaeocene		—

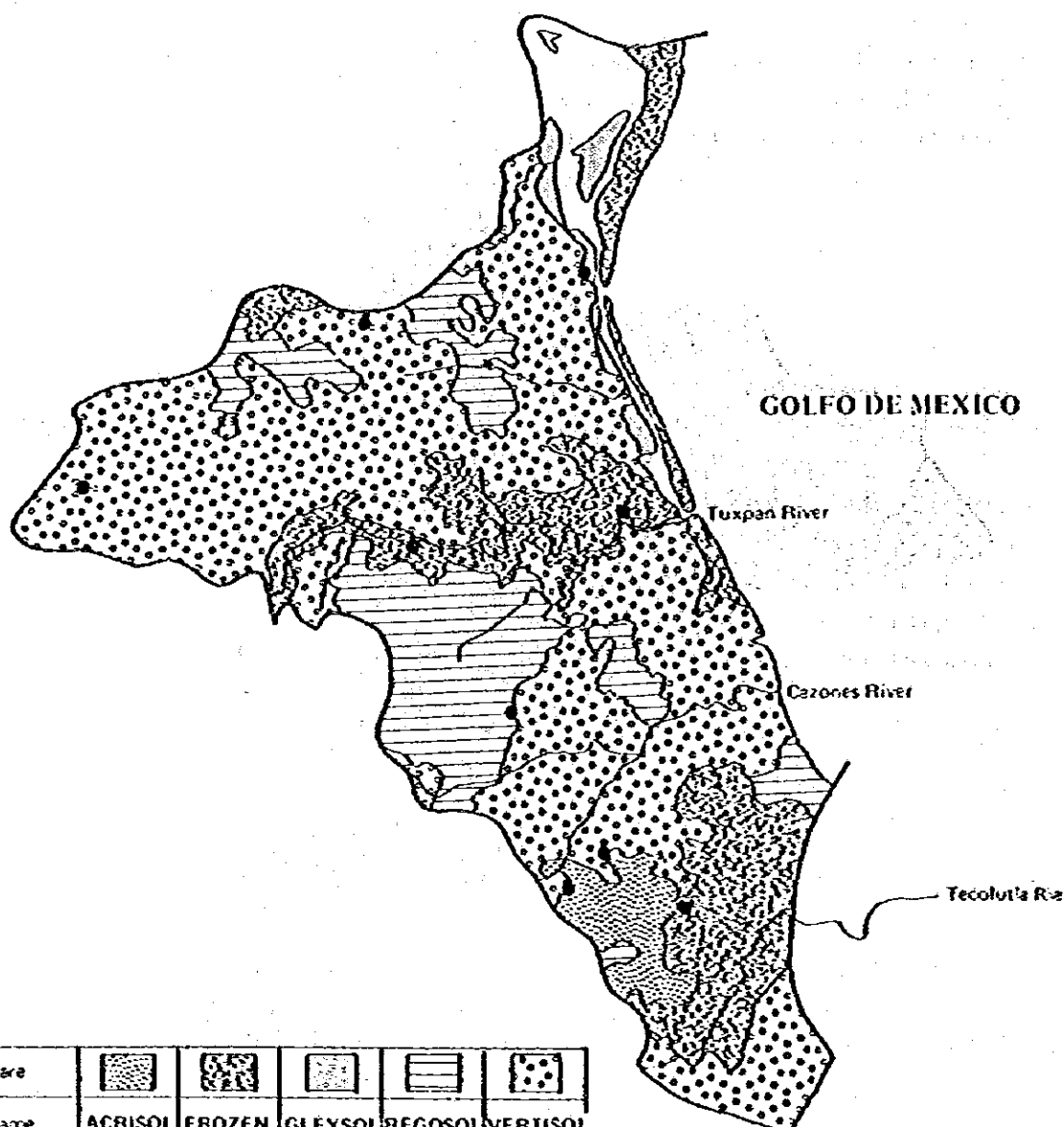
base intrusive igneous rock lgeb

leucitite lu

soil s

arenite ar

Fig. III-1-(3) Geological Map








area					
name	ACRISOL	FROZEN	GLEYSOL	REGOSOL	VERTISOL
nutrition	poor	rich			
climate	tropical temperate	dry temperate tropical	watery area		temperate hot
vegetation	forest	every sort	pasture cane	diffe- rent	various
erosion	suscep- tibility	a little suscep- tibility	little suscep- tibility	diffe- rent	low suscep- tibility

Fig. III-1(4) Soil Distribution

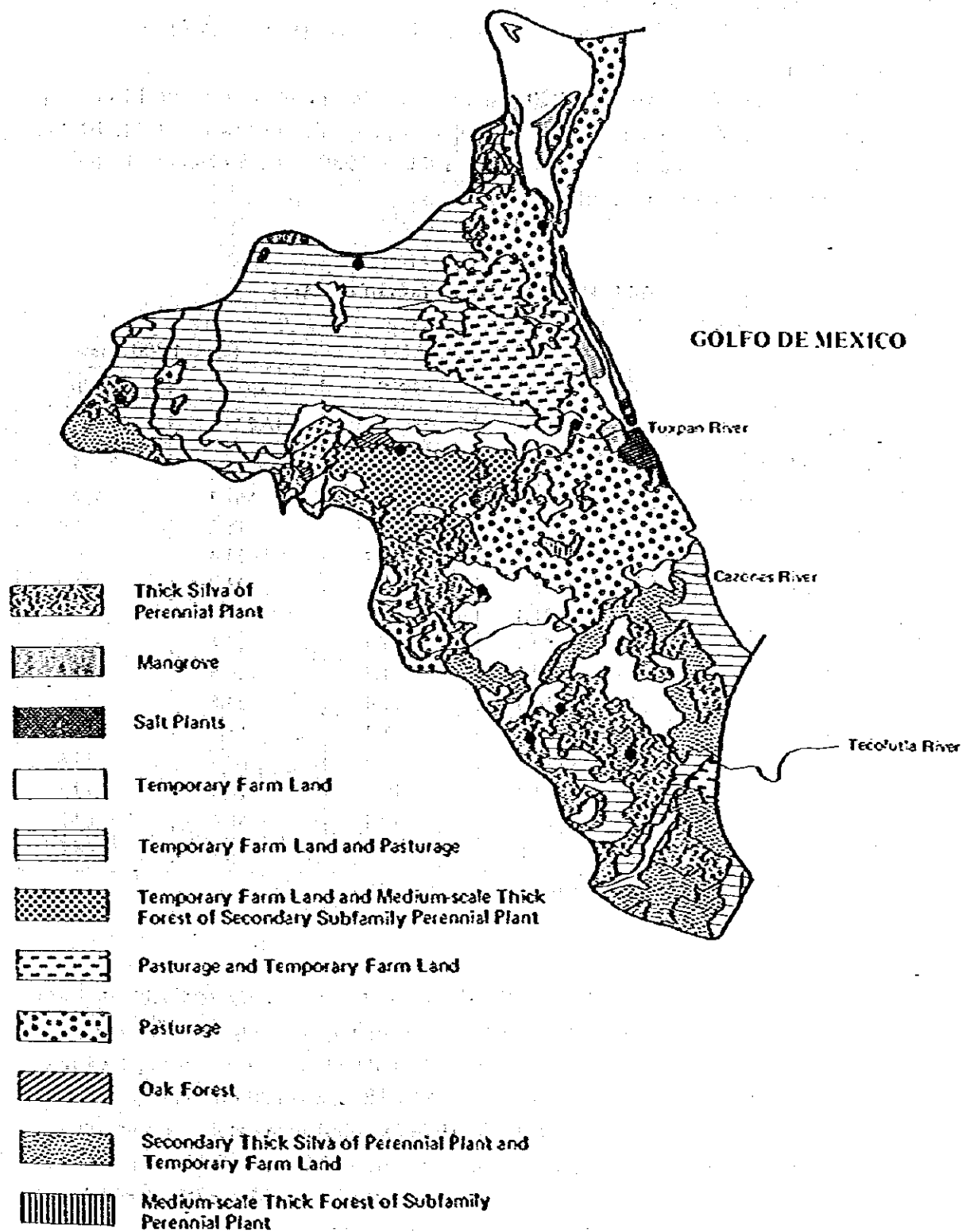


Fig. III-1-(5) Geographical Distribution of Vegetation

2. General Socio-Economic Condition

2-1 Population

The population of the Area in 1980 was 730 thousand persons or about 14 percent of the total population of Veracruz State (5,300 thousand persons), as shown in Table III-2-(1). The average rate of annual population increase from 1970 to 1980 was 2.5 percent which was smaller than that of the national 3.4 percent.

Table III-2-(1) Population of the Area

(Unit: 1,000 Persons)

	1950	1960	1970	1980
Mexico	25,791	34,923	48,225	67,382
Veracruz State	2,040	2,728	3,815	5,264
Development Area Total	243.8	377.2	567.3	729.6
Cozcos	9.1	12.7	18.2	21.0
Cerro Azul	6.8	11.4	23.4	30.3
Coatimila	5.7	13.2	23.2	30.3
Chicontepec	31.4	35.7	46.6	57.8
Papanila	50.2	67.7	97.1	124.6
Poza Rica	28.5	71.8	120.5	161.5
Donishua	16.6	19.4	24.5	29.2
Trayo	4.9	8.2	13.6	16.7
Temapache	50.0	44.2	63.3	89.8
Tepehualtla	7.2	10.8	10.4	12.3
Tehuacan	16.8	32.4	55.4	67.5
Duxpan	36.6	49.7	71.1	88.6

(Source: Censo Estadístico 1980)

As for the population distribution in the Area, the population concentrates on Poza Rica, Papanila, Temapache and Duxpan; these four "municipios" account for 63.7 percent of the entire Area.

The economically active population in the Area in 1980 was 170 thousand persons or about 13 percent of Veracruz State, as shown in Table III-2-(2).

As for the composition in the population of economic activities, both Veracruz State and the Area show a larger percentage of primary industries than does the nation, which indicates indirectly that the Area has been left behind in industrialization.

Table III-2-(2) Economically Active Population in the Area

(Unit: 1,000 Persons)

		1950	1960	1970	1980*	Remarks
Mexico	Total	8,272	11,253	12,955	16,800	*) Estimated
	Primary	4,823 (58.3)	6,077 (54.0)	5,104 (39.4)	4,400 (26)	
	Secondary	1,315 (15.9)	2,138 (19.0)	3,420 (26.4)	5,600 (33)	
	Tertiary	2,134 (25.8)	3,038 (27.0)	4,431 (34.2)	6,800 (41)	
Veracruz State	Total	650	887	1,000	1,300	
	Primary	435 (66.9)	572 (64.5)	531 (53.1)	520 (40)	
	Secondary	78 (12.0)	131 (14.8)	169 (16.9)	330 (25)	
	Tertiary	137 (21.1)	184 (20.7)	300 (30.0)	450 (35)	
Development Area	Total			141	170	
	Primary			72 (50.6)	66 (39)	
	Secondary			29 (20.4)	43 (25)	
	Tertiary			40 (29.0)	61 (36)	

Note: () indicates the percent of the total population of economic activities.

(Source: Agenda Estadístico 1982 (Gov. of Veracruz State))

2-2 Gross Domestic Product

The gross domestic product (GDP) of the Area, for 1980, was 35.13 billion pesos at current prices or 13.4 percent of the total GDP of Veracruz State, as shown in Table III-2-(3).

GDP at 1970 prices and per-capita GDP are also shown in Table III-2-(3). The annual growth rates of these two indices are as follows.

		'60/'70	'70/'80	'75/'80
GDP growth rate (%) (at constant prices)	Mexico	7.0	6.6	6.7
	Veracruz State	7.4	3.9	3.8
	Development Area	—	3.0	3.0
Per-capita GDP growth rate (%)	Mexico	3.6	3.1	3.1
	Veracruz State	3.8	0.6	0.5
	Development Area	—	0.4	0.6

Table III-2-(3) GDP of the Area

Unit: GDP; Billion Pesos
Per-capita GDP; 1,000 Pesos

Area	Index	1960	1970	1975	1980
Mexico	GDP (current prices)	160.1	444.3	1,100.0	4,276.5
	GDP (1970 prices)	225.9	444.3	610.0	841.9
	Per-capita GDP (1970 prices)	6.47	9.21	10.70	12.49
Veracruz State	GDP (current prices)	12.3	35.3	77.4	262.6
	GDP (1970 prices)	17.3	35.3	42.9	51.7
	Per-capita GDP (1970 prices)	6.34	9.25	9.57	9.82
Development Area	GDP (current prices)		5.16	10.79	35.13
	GDP (1970 prices)		5.16	5.98	6.92
	Per-capita GDP (1970 prices)		9.10	9.22	9.48

Note: 1) GDP of Veracruz State is estimated by Univ. of Veracruz (1960, 1970) and SPP (1980)

2) GDP of the Area is estimated by the assumption that GDP per sectoral population of economic activities is uniform in Veracruz State at 1970, 1975 and 1980.

(Source: SPP)

Both Veracruz State and the Area show growth rates of these two indices lower than the national from 1970 to 1980. So, future development is strongly expected in the Area.

As for the sectoral composition of GDP, the sectors in which Veracruz State has a relatively high percentage of the national total are mining and construction, as shown in Table III-2-(4).

Table III-2(4) GDP by Sector

(Unit: Billion Pesos at 1980)

Sector \ Area	Mexico (a)	Veracruz State (b)	(b)/(a) x 100 (%)
1. Agriculture	357.1	22.9	6.4
2. Mining	291.4	39.7	13.6
3. Manufacturing Industry	985.0	50.2	5.1
4. Construction	276.2	27.1	9.8
5. Electricity	42.0	2.2	5.2
6. Distribution	1,287.7	72.6	5.6
7. Services	1,046.1	48.0	4.6
Total	4,276.5	262.6	6.1

(Source: Sistema de Cuentas Nacionales de Mexico (SPP))

2.3 Economic Activities

(1) Agriculture and stock farming

The cultivated land and agricultural yield of the Area had been decreasing from 1970 to 1977, as shown in Table III-2(5). Generally, agricultural activities were stagnant in recent years. Main crops are maize, kidney bean, citric produce and so on, as shown in Table III-2(6).

Table III-2(5) Agricultural Activities (1970 - 1977)

Municipio	Cultivated land (ha)		Yield (tons)	
	1970	1977	1970	1977
Castillo de Teayo	8,648	3,375	15,450	7,752
Tamiahua	18,075	4,334	63,929	28,340
Temapache	46,750	29,736	147,862	102,848
Tuxpan	11,719	11,243	36,706	48,807
Cerro Azul	1,275	2,644	1,615	5,440
Tepetzintla	8,032	4,895	13,030	9,096

(Source: SARH (Jalapa))

Table III-2-(6) Selected Agricultural Yield

Crop	Cultivated land (ha)		Yield (1,000 tons)		Yield (1,000 pesos)	
	'70	'77	'70	'77	'70	'77
Cane	1,009	818	57.5	44.3	3,476	8,630
Coffee	3,685	4,499	10.5	2.6	15,771	116,190
Citric produce	8,507	11,200	85.2	110.7	25,937	67,686
Kidney bean (winter)	12,685	6,587	12.1	3.2	24,382	17,325
Kidney bean (temporal)	28,540	1,698	26.3	0.8	52,562	4,543
Maize (winter)	46,800	23,812	98.6	21.2	92,693	61,622
Maize (temporal)	73,150	39,900	123.6	51.9	116,165	150,365
Mango	75	346	0.7	3.7	891	8,903
Potato	90	2	0.7	0.0	1,260	20
Banana	202	196	2.0	2.2	1,167	2,065
Pineapple	10	13	0.2	0.3	100	234

Note: These data are the total value of 13 "Municipios" — 6 in the Area and 7 in the surrounding area.

(Source: SARH (Jalapa))

As for the composition of agriculture, forestry and stock farming, agriculture and stock farming play an important role in the Area, but forestry activities are very small, as shown in Table III-2-(7).

The central "municipios" for agriculture are Papantla, Temapache and Tihuatlan, and for stock farming are Temapache, Tuxpan and Papantla.

Table III-2-(7) Outputs of Agriculture, Stock Farming and Forestry (1969)

(Unit: Million Pesos)

Area	Agriculture	Forestry	Farming	Total
Veracruz State	2,541.8	29.1	521.7	3,092.5
Development Area Total	391.6	15.1	64.8	471.5
Cazones	26.6	0.0	2.4	29.0
Cerro Azul	1.2	0.0	1.2	2.4
Coatzintla	11.6	0.0	2.1	13.7
Chicontepeec	30.5	0.7	7.9	39.1
Papantla	135.7	7.7	8.7	152.1
Poza Rica	1.3	0.0	0.1	1.4
Tamiahua	8.4	0.0	5.9	14.3
Teayo	6.1	0.0	6.1	12.2
Temapache	74.4	0.0	12.5	86.9
Tepetzintla	3.7	1.0	3.2	7.9
Tihuatlan	56.0	2.9	5.0	63.9
Tuxpan	36.1	2.8	9.7	48.6

(Source: V Censo Agricola-Ganadero y Ejidal 1970, Veracruz (SPP))

Cattle and pigs are the main livestock in the Area. The former is fed in such "municipios" as Temapáche, Chicontepec and Tuxpan, and the latter in such "municipios" as Temapáche and Chinconetepec, as shown in Table III-2-(8).

Table III-2-(8) Livestock Population of the Area

(Unit: Heads at 1976)

Area	Cattle	Sheep	Goat	Pig
Development Area Total	381,740	6,502	11,575	67,058
Cazones	19,812	99	190	1,552
Cerro Azul	630	107	1,532	232
Coatzinilla	6,476	2,896	8,582	3,227
Chicontepec	71,923	163	141	16,275
Papantla	56,845	—	90	5,570
Poza Rica	1,152	—	32	957
Tamiahua	33,116	365	163	4,681
Teayo	17,039	147	355	3,328
Temapáche	86,820	509	153	10,896
Tepetzintla	5,701	635	—	8,652
Tihuatlan	20,218	180	135	4,732
Tuxpan	62,008	1,401	202	6,956

(Source: SARI)

(2) Fishery

The fishery production of the nation in 1980 was 1.26 million tons, of which 0.22 million tons (about 17 percent) came from the Gulf, as shown in Table III-2-(9).

Veracruz state recorded 71 thousand tons, but Tuxpan administrative region* only 2 thousand tons. Probably this is due to undeveloped ocean fishing and inadequate fishing equipment.

Table III-2-(9) Fishery Production by Region (1976 - 1981)

(Unit: Tons)

Area	1976	1977	1978	1979	1980	1981
Mexico	524,689	562,106	818,511	1,002,925	1,257,146	—
Pacific	415,992	448,231	626,916	769,255	1,006,724	—
Gulf	107,993	113,036	179,143	189,707	222,329	—
Veracruz State	35,572	32,039	51,112	60,552	71,449	96,439
Tuxpan administrative region	—	2,538	1,035	2,454	2,466	2,176

Note: 1) — indicates no available data.

2) This table is based on the fisherman - belonging statistics.

(Source: Secretaría de Pesca)

* Coastal regions from Tamiahua to Cazones.

Main seafood species are oysters and shrimp in both Veracruz State and the Tuxpan administrative region, and are used mostly for direct human consumption and very little for processing, as shown in Table III-2-(10).

As for the fishery resources, shrimp, tuna and scale fish can be found in the Gulf, as shown in Fig. III-2-(1). But from the national viewpoint, much more abundant fishery resources can be found in the Pacific, especially around the California Peninsula.

The fishing boats of the nation in 1979 numbered about 30 thousand, most of which were small boats below 1 ton. Tuxpan administrative region had only 348 boats, as shown in Table III-2-(11).

The central fishing regions in Veracruz State are Villa Cuauhtemoc, Alvarado, La Laja and so on, and Tuxpan administrative region shows a very small share, as shown in Table III-2-(12).

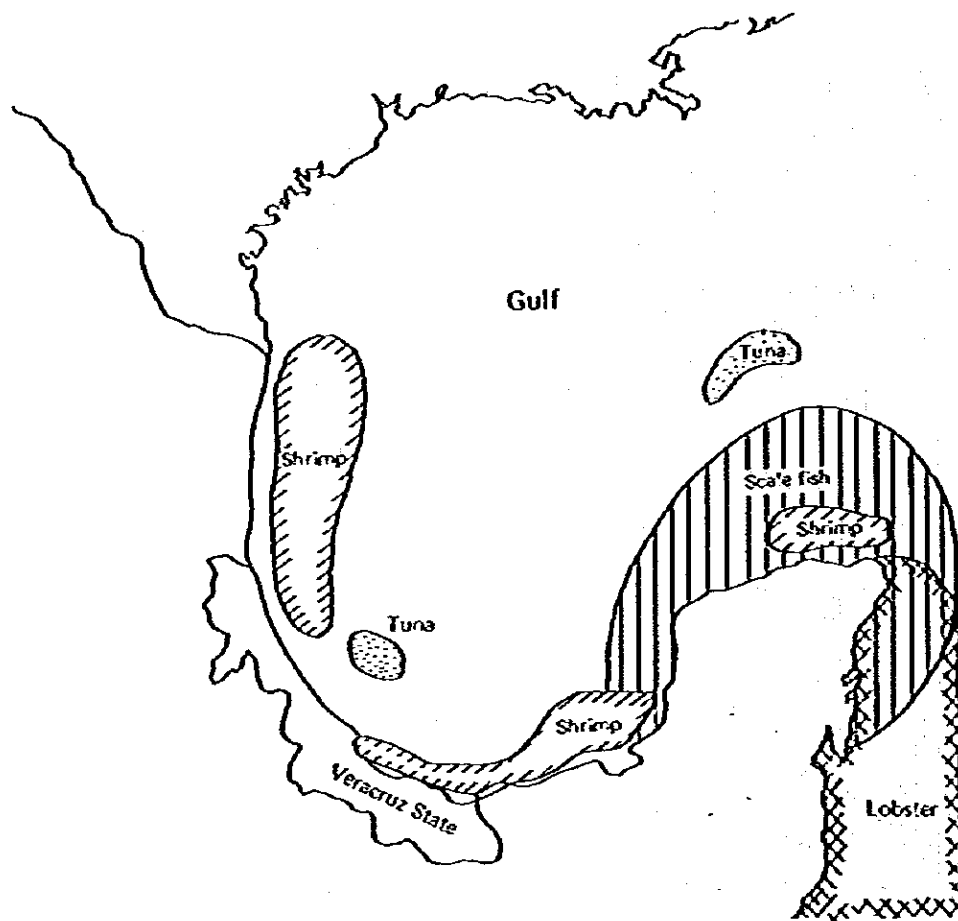
Table III-2-(10) Fishery Production by Species

Area	Use	Total Production (tons)	Total Value (million pesos)	1st Species		2nd Species		3rd Species		Remarks
				Production	Value	Production	Value	Production	Value	
Mexico	direct human consumption	560,800	19,445	100,823	209	51,226	7,361	Shrimp	Oyster	1980
	indirect human consumption	468,777	572	257,746	284	167,007	184	Sardine	-	"
	industrial use	28,879	342	22,082	62	3,536	39	Sargasso	-	"
					100,897	209	33,732	4,753	Shrimp	Anchovy
Pacific	direct human consumption	344,050	9,985	256,101	282	161,556	176	Sardine	-	"
	indirect human consumption	456,267	496	22,082	61	3,302	37	Sargasso	-	"
	industrial use	28,103	312	38,645	340	17,994	2,389	Oyster	Mojarra	"
					4,422	6	-	-	Sardine	-
Gulf	direct human consumption	194,287	8,674	-	-	-	-	-	-	"
	indirect human consumption	8,658	12	-	-	-	-	-	-	"
	industrial use	300	23	-	-	-	-	-	-	"
					25,892	175	6,876	195	Oyster	Mojarra
Veracruz State	direct human consumption	68,716	1,796	-	-	-	-	-	-	"
	indirect human consumption	468	-	-	-	-	-	-	-	"
	industrial use	16	1	-	-	-	-	-	-	"
					794	119	776	10	Shrimp	Oyster
Tuxpan administrative region			2,176							

Note: 1) -: no available data

2) -: abbreviation

3) This table is based on the fishing-port-belonging statistics. (Source: Secretaria de Pesca)



(Source: Secretaria de Pesca)

Fig. III-2-(1) Fishery Resources in the Gulf

Table III-2-(11) Fishing Boats by Region

(Unit: Boats)

Area	Total	below 1 ton	1-3 ton	3-5 ton	5-10 ton	10-20 ton	20-40 ton	40- 60 ton	60- 80 ton	80- 100 ton	over 100 ton	Remarks
Mexico	30,418	17,231	8,691	893	379	244	707	1,541	545	129	58	1979
Pacific	16,772	9,042	5,520	337	132	95	367	815	346	62	56	"
Gulf	12,795	7,343	3,166	556	247	149	340	726	199	67	2	"
Veracruz State	7,018	4,948	1,594	135	65	30	102	112	22	10	-	"
Tuxpan administrative region	348	296	3	6	3	13	16	11	-	-	-	1982

Note: 348 boats, of which 303, 43 and 2 boats are made of wood, glass fibre and steel respectively.
(Source: Secretaria de Pesca)

Table III-2-(12) Fishery Production by Administrative Region (1980)

Administrative Region	Production (tons)	Value (million pesos)
Alvarado	12,260	510
Catemaco	3,757	126
Coatzacoalcos	2,058	105
La Laja	11,968	103
Naranjos	2,418	40
Nantla	574	19
Tamiahua	6,036	106
Tecolutla	702	21
Tlacotalpan	828	31
Tuxpan	2,491	82
Veracruz	2,483	142
Villa Cuauhtemoc	14,684	314
Others*	8,942	203
Total	69,200	1,799

Note: *; by fishery with no official registration
(Source: Secretaría de Pesca)

(3) Industry*)

The industrial production of the nation in 1980 was 531,662 million pesos at 1970 prices, and that of Veracruz State was 21,373 million pesos or about 4 percent to the national total, as shown in Table III-2-(13).

Annual growth rates of industrial production and gross added value are as follows.

		'65/'70	'70/'75	'75/'80	'70/'80
Gross Added Value growth rate (%) (at constant prices)	Mexico	9.2	5.5	15.8	10.5
	Veracruz State	4.7	7.6	15.5	11.5
Industrial Production growth rate (%) (at constant prices)	Mexico	9.0	5.6	13.8	9.6
	Veracruz State	5.6	5.4	13.5	9.4

The growth of industrial activities from 1975 to 1980 is very remarkable, and its growth rate is over 13 percent in both Mexico and Veracruz State.

As for the distribution in the Area, industrial functions concentrate on Papantla, Poza Rica and Temapapache, as shown in Table III-2-(14). Main industrial types are such light industries as the food processing industry and the beverage industry.

*) Excluding extraction and refinery of petroleum and basic petrochemical industry.

Table III-2-(13) Industrial Production (1965 - 1980)

(Unit: Million Pesos)

Area	Index	1965	1970	1975	1980
Mexico	Num. of establishments	136,066	119,963	119,212	-
	Personnel (persons)	1,409,894	1,581,247	1,707,919	-
	Gross added value (current prices)	46,622	82,383	182,831	985,013
	Gross added value (1970 prices)	52,980	82,383	107,548	224,377
	Industrial production (current prices)	121,561	212,404	473,148	2,335,171
	Industrial production (1970 prices)	138,138	212,404	278,322	531,662
Veracruz State	Num. of establishments	7,075	6,358	6,106	-
	Personnel (persons)	64,855	63,250	66,146	-
	Gross added value (current prices)	2,424	3,048	7,456	39,596
	Gross added value (1970 prices)	2,755	3,048	4,386	9,020
	Industrial production (current prices)	5,834	8,709	19,266	93,874
	Industrial production (1970 prices)	6,630	8,709	11,333	21,873
Deflator (1970 = 100)		88	100	170	439

Note: -; no available data

(Source: Censo Industrial, 1965, 1970, 1975, 1980 (SPP))

From a national point of view, the central Gulf region, containing Veracruz State, has little industry with only the food industry, the chemical industry and the basic metal industry, showing over 4 percent of the national total of gross added value, as shown in Table III-2-(15).

Table III-2-(14) Industrial Activities of the Area (1975)

Área	Personnel (persons)	Gross Production (million pesos)	Gross Added Value (million pesos)
Mexico	1,707,919	473,148	182,830
Veracruz State	66,146	19,266	7,456
Development Area	2,818	381.0	103.0
Cazónes	21	0.7	0.2
Cerro Azul	137	5.1	2.5
Coatzacoatlán	22	4.2	1.7
Chicontepec	11	0.2	0.1
Papantla	611	142.9	48.2
Poza Rica	935	81.7	7.2
Tamiagua	31	1.2	0.4
Teayo	21	0.3	0.3
Temapache	312	67.5	7.1
Tepetzintla	13	0.1	0.1
Tihuatlán	258	35.4	15.8
Tuxpan	446	41.7	19.4

Note: Excluding extraction and refinery of petroleum and basic petrochemical industry.
 (Source: X Censo Industrial, 1975 (SPP))

Table III-2-(15) Industrial Distribution by Industry Type (1975)

	Metropolitan region	Northern Gulf region	Northern region	Northern Pacific region	Central Gulf region	Central Pacific region	Central region	Northern Central region	Peninsula region	Southern Pacific region
Food industry	33.1	15.1	3.4	11.4	8.7	13.3	7.7	2.9	1.6	2.0
Textile industry	57.4	3.8	4.6	2.6	2.9	4.7	18.3	1.5	3.8	0.4
Furniture industry	36.2	5.2	8.8	4.4	0.4	19.2	11.0	7.8	2.0	4.9
Paper and pulp industry	61.9	11.1	6.6	1.7	-	7.8	2.2	0.4	0.08	-
Publishing and printing industry	79.4	7.9	2.5	3.2	0.8	2.2	2.3	0.7	0.8	0.3
Chemical industry	68.7	11.1	2.6	1.0	4.3	7.1	5.5	1.1	0.1	0.1
Non-ferrous metal industry	41.7	24.1	5.3	4.3	1.5	6.9	10.6	3.4	1.3	0.8
Basic metal industry	30.9	22.6	24.4	0.4	5.7	2.1	14.1	0.7	-	-
Metal manufacturing industry	69.0	13.3	4.9	2.5	1.0	4.1	4.1	0.8	0.1	0.1
Machinery industry	57.0	13.1	4.4	1.4	2.2	5.4	14.9	1.3	0.1	0.1
Electric machinery industry	70.1	10.9	7.1	6.0	0.1	3.2	2.4	1.1	0.1	0.6
Transportation Machinery industry	53.6	6.9	3.5	3.9	1.1	2.0	28.6	0.3	0.1	0.04
Other industry	71.8	1.2	3.2	3.4	0.1	10.7	5.4	0.8	0.1	3.3

Note: Metropolitan region D.F., Mexico
 Northern Gulf region Nuevo Leon, Tamaulipas
 Northern region Chihuahua, Coahuila
 Northern Pacific region Sonora, Sinaloa, Nayarit, B. California N. and S.
 Central Gulf region Veracruz, Tabasco
 Central Pacific region Jalisco, Michoacan
 Central region Guanajuato, Queretaro, Hidalgo, Puebla, Morelos, Tlaxcala
 Northern Central region Durango, Zacatecas, San Luis Potosi
 Peninsula region Yucatan, Campeche, Quintana Roo
 Southern Pacific region Guerrero, Oaxaca, Chiapas

This table is based on the statistics of gross added value.
 (Source: X Censo Industrial, 1975 (SPP))

(4) Petroleum production, refinery and primary petrochemical industry

The Area is situated in the coastal belt zone of crude oil resources spreading from the southern Gulf to Tampico region. In the Area, Poza Rica and Tuxpan are the centers for the crude oil production. Chicontepec-Tuxpan Project is mainly focused on crude oil development.

The crude oil and natural gas productions in 1979 were 42 million barrels and 63 billion cubic feet, or 7.8 percent and 5.9 percent of the national total respectively. The production of the refinery and primary petrochemical industry is only 4 percent of the national total.

Generally, the Area has a great potential for crude oil development, but at present it does not play an important role in the nation.

As for the transportation network of crude oil and natural gas, the Area is located in the center of principal pipeline network along the Gulf coast, as shown in Fig. III-2-(2). It puts the Area in a very advantageous position for petroleum related development in the future.

Table III-2-(16) Production of Crude Oil and Natural Gas (1979)

	Crude Oil (Barrels)	Natural Gas (Million Cubic Feet)
Total	536,925,950 (100.0)	1,064,554 (100.0)
North Zone	23,043,910 (4.3)	242,398 (22.8)
Poza Rica Zone	45,307,450 (8.4)	75,048 (7.0)
Poza Rica District	41,915,505 (7.8)	62,811 (5.9)
C. Papaloapan District	3,391,345 (0.6)	12,237 (1.1)
South Zone	468,574,590 (87.3)	747,108 (70.2)

Note: (); percentage to the total
(Source: PEMEX)

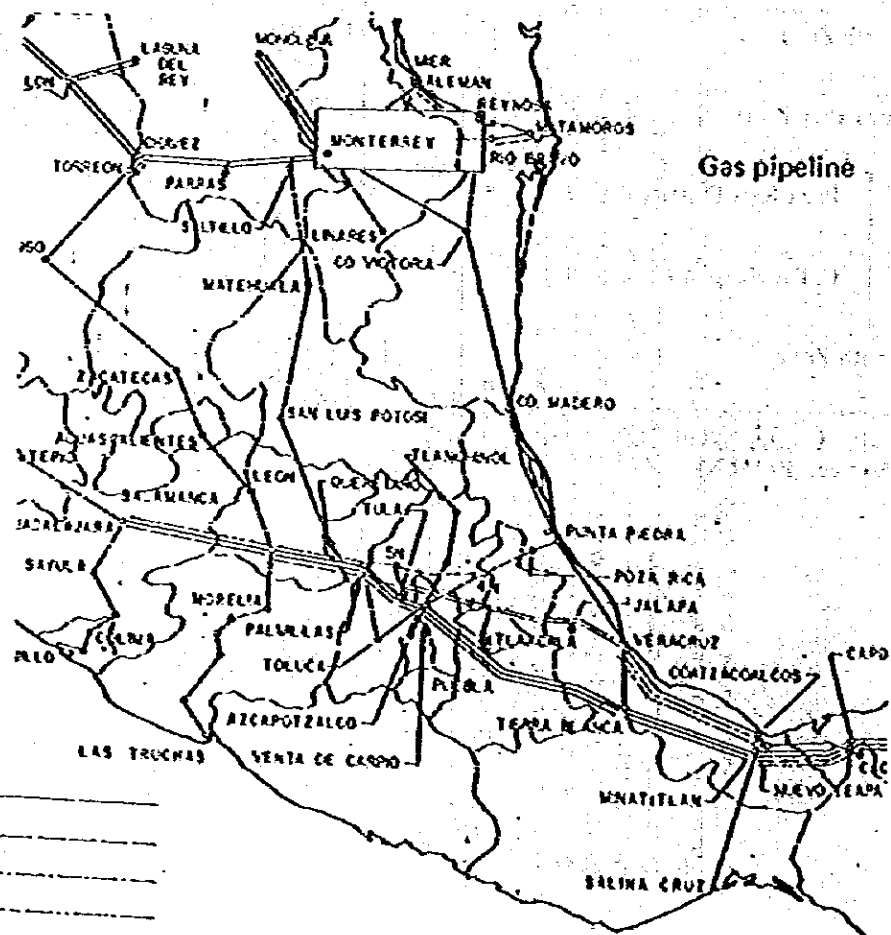
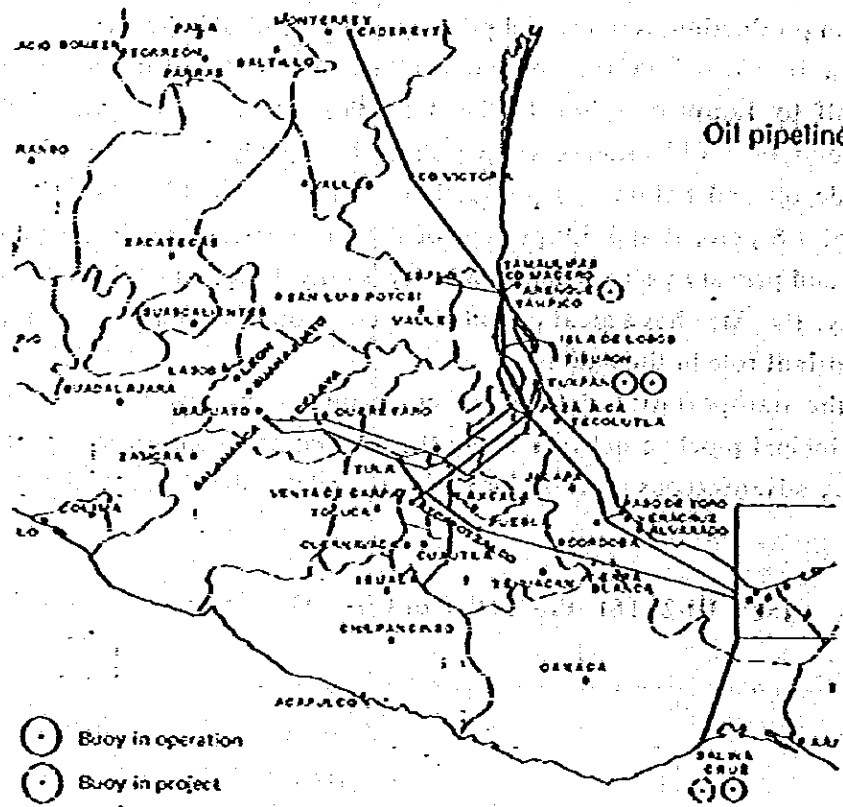


Fig. III-2(2) Pipeline Network

(Source: FEVEX)

(5) Commerce and service

The net sales value of the Area in 1975 was 1,743 million pesos or 12.3 percent of Veracruz State, as shown in Table III-2-(17). In the Area, Poza Rica occupied over 60 percent of the Area total, and Tuxpan and Papanlla were relatively large.

The same tendencies can be found in the services, as shown in Table III-2-(18).

Table III-2-(17) Commercial Activities (1975)

Area	Personnel Occupied (persons)	Net Sales Value* (million pesos)	Gross Added Value (million pesos)
Mexico	1,118,028	328,554	89,919
Veracruz State	62,472	14,217	3,853
Development Area	9,089	1,742.9	473.6
Cazones	176	4.8	1.3
Cerro Azul	507	73.3	21.2
Coatzintla	191	15.3	4.0
Chicotepec	129	8.9	2.3
Papanlla	1,212	103.1	29.7
Poza Rica	4,112	1,066.1	295.0
Tamiagua	254	12.7	3.3
Teayo	69	4.7	0.9
Temapache	397	76.9	18.0
Tepetzintla	65	1.7	0.3
Tihuatlan	592	46.8	11.5
Tuxpan	1,385	328.6	86.1

Note: *Including other diversified incomes.

(Source: SPP)

Table III-2-(18) Activities of Services (1975)

Area	Personnel Occupied (persons)	Gross Income (million pesos)	Gross Added Value (million pesos)
Mexico	712,609	62,576	36,171
Veracruz State	34,383	2,389	1,426
Development Area Total	5,115	237.1	131.6
Cazones	55	1.4	0.5
Cerro Azul	377	9.6	5.3
Coatzintla	56	1.5	0.6
Chicotepec	56	1.4	0.4
Papanlla	472	18.1	9.9
Poza Rica	2,403	114.6	71.0
Tamiagua	108	4.7	2.0
Teayo	26	0.8	0.2
Temapache	207	9.9	4.5
Tepetzintla	46	1.2	0.4
Tihuatlan	389	16.2	6.4
Tuxpan	920	57.7	30.4

(Source: VII Censo de Servicios 1976 (SPP))

(6) Tourism

The number of visitors to Tuxpan fluctuated greatly from year to year, about 340 thousand persons in 1977 and about 150 thousand persons in 1981, as shown in Table III-2-(19). But these statistics are not limited to visitors coming for as tourists, so the number of tourists would be much smaller.

The alien visitors to Tuxpan in 1979 were only 4 thousand persons or 0.1 percent to the national total, as shown in Table III-2-(20).

Table III-2-(19) Visitors to Tuxpan (1970 - 1981)

(Unit: Persons)

	1977	1978	1979	1980	1981
Mexicans	336,566	152,149	145,013	332,304	145,840
Foreigners	5,934	5,271	4,017	4,350	5,260
Total	342,480	157,420	149,030	336,654	151,100

(Source: Delegado Estatal de Turismo de Tuxpan.)

Table III-2-(20) Alien Visitors to Tuxpan (1972 - 1981)

(Unit: Thousand Persons)

Area	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Mexico	2,914.7	3,226.3	3,362.3	3,217.8	3,107.1	3,247.1	3,754.0	4,135.0	*	*
South-East Zone	186.5	274.2	326.1	331.4	376.0	409.1	657.0	810.5	*	*
Tuxpan	*	*	*	*	*	5.9	5.3	4.0	4.4	5.3

Note: 1) South-East Zone includes Veracruz State, Yucatan State and so on.

2) *; no available data

(Source: Banco de Mexico, Secretaria de Turismo)

3. Present Condition of the Cities

In this section, the cities in the Area will be examined generally in respect to population, land use, industries, transport and urban facilities, and their present characteristics will be discussed.

3-1 Population of the Cities

Population by municipio and degree of urban concentration are shown in Table III-3-(1) and Fig. III-3-(1) respectively. The population densities are shown in Table III-3-(2). From these tables and the figure, it can be seen that the municipio of Poza Rica has a large population and a relatively high growth rate while the municipio of Temapache has a growth rate of population exceeding that of the country and state. Further, it will also be noted that greater concentration rate of population is noticeable in Poza Rica, Cerro Azul and Coatzintla and that Poza Rica has a particularly high population density.

Table III-3-(1) Population

	Municipio Population (and annual increasing rate)			Ciudad Population (and the rate of concentration into a central town)		
	1960	1970	1980	1960	1970	1980
Mexico						
	(3.0%)	(3.2%)	(3.3%)			
Veracruz State						
	(2.9%)	(3.3%)	(3.2%)			
Development Area Total	377,111 (4.3%)	567,216 (4.0%)	729,354 (2.5%)			
1 Cazones	12,683 (3.3%)	18,207 (3.6%)	20,956 (1.4%)			
2 Cerro Azul	11,431 (5.1%)	23,406 (6.9%)	30,329 (2.6%)	8,448 (73.9%)	20,269 (86.6%)	23,474 (77.4%)
3 Coatzintla	13,154 (7.8%)	23,205 (5.5%)	30,315 (2.7%)	8,389 (63.8%)	13,734 (59.2%)	23,476 (77.4%)
4 Chicontepec	35,742 (1.3%)	46,553 (2.6%)	57,784 (2.2%)	3,287 (9.2%)	2,821 (6.1%)	3,501 (6.1%)
5 Papanitla	67,660 (3.0%)	97,092 (2.1%)	124,552 (2.5%)	18,865 (27.9%)	26,773 (27.6%)	*34,563 (27.8%)
6 Poza Rica	71,770 (8.6%)	120,462 (5.1%)	161,455 (2.9%)	71,770 (100%)	120,462 (100%)	161,455 (100%)
7 Tamiahua	19,424 (1.6%)	24,502 (2.3%)	29,145 (1.7%)			
8 Teayo	8,199 (4.9%)	13,575 (4.9%)	16,664 (2.0%)	1,755 (21.4%)	2,699 (19.9%)	6,000 (36.0%)
9 Temapache	44,150 (3.5%)	63,302 (3.6%)	89,785 (3.5%)	6,438 (14.6%)	9,954 (15.7%)	12,624 (14.1%)
10 Tepetzintla	10,817 (4.0%)	10,374 (-0.4%)	12,306 (1.7%)	2,397 (22.2%)	3,236 (31.2%)	3,432 (27.9%)
11 Tihuatlan	32,395 (6.4%)	55,408 (5.2%)	67,490 (2.0%)	3,735 (11.5%)	8,162 (14.7%)	17,989 (26.7%)
12 Tuxpan	49,686 (3.0%)	71,130 (3.5%)	88,573 (2.2%)	23,262 (46.8%)	33,901 (47.7%)	37,748 (42.6%)

Note: Mark * -- presumed value

(Source: Plan De Desarrollo Urbano, Censamiento Estadístico 1980)

Table III-3-(2) Population Density (1980)

	Population Density (1980)	
	Municipio (persons per km ²)	Ciudad (persons per ha)
1 Cazones*	79 (265 km ² , 20,956)	—
2 Cerro Azul	327.9 (92.5 km ² , 30,329)	49.2 (477ha)
3 Coatzintla*	106 (285 km ² , 30,315)	112.9 (208ha)
4 Chicontepec	59.1 (978 km ² , 57,784)	28.0 (125ha)
5 Papanitla*	75 (1,665 km ² , 124,552)	63.2 (547ha)
6 Poza Rica*	4,036 (40 km ² , 161,455)	71.3 (2,264ha)
7 Tamiahua*	23 (1,290 km ² , 29,145)	—
8 Teayo	37.2 (447.46 km ² , 16,664)	—
9 Temapache	71.1 (1,262 km ² , 89,785)	78.9 (160ha)
10 Tepetzintla	50.1 (245.56 km ² , 12,306)	171.6 (20ha)
11 Tihuatlan*	121 (560 km ² , 16,490)	62.0 (290ha)
12 Tuxpan	83.4 (1,062 km ² , 88,573)	75.5 (500ha)

Note: Mark * — measured on the map
(Source: Plan De Desarrollo Urbano)

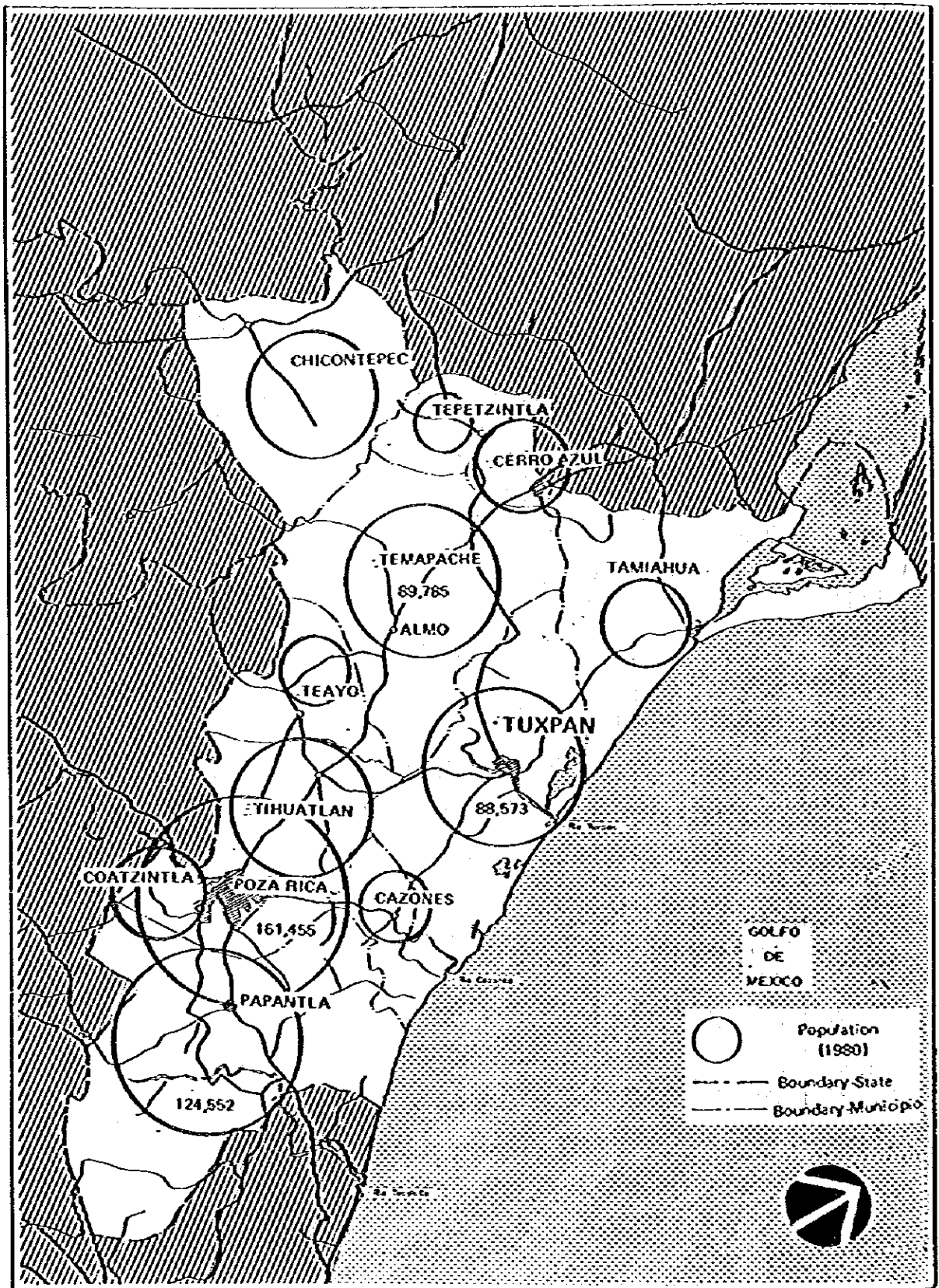


Fig. III-3-(1) Development Area and the Distribution of Population

3-2 Land Use

As shown in Table III-3-(3) and Fig. III-3-(2), the land use in the Area is mostly for farm land, pasture, etc. being a great area; while forest cover only a small area. The characteristics of land use composition and area are as follows.

(1) Land use composition

- (a) Cities with a great proportion of farm land, pasture, etc.:
Tehuacán, Papantla, Cázones, Temapache and Cerro Azul.
- (b) City with a relatively large proportion of forest:
Tepetzintla.
- (c) Cities with a large proportion of the others:
Tamiagua, Teayo and Poza Rica.

(2) Land use area

- (a) Cities with a large area of farm land, pasture, etc.:
Papantla, Temapache, Tuxpan and Tehuacán
- (b) Cities with a great area of forest:
Papantla and Chicontepec

Table III-3-(3) Existing Land Utilization (1970)

(Unit: Ha)

	Total Area	Agricultural Land	Stock Farm	Forest	Others	
Development Area	828,452	390,142 (47.1)	106,120 (12.8)	89,477 (10.8)	242,713 (29.3)	
1 Cázones ^a	26,500	16,594 (62.6)	2,689 (10.1)	215 (0.8)	7,002 (26.5)	●
2 Cerro Azul	9,250	5,647 (61.0)	604 (6.5)	1,439 (15.6)	1,560 (16.9)	○
3 Coatzacoatlán ^a	28,500	15,324 (54.0)	745 (2.6)	1,532 (5.4)	10,839 (38.0)	■
4 Chicontepec	97,800	33,002 (33.7)	19,411 (19.9)	18,722 (19.1)	26,665 (27.3)	□
5 Papantla ^a	166,500	91,733 (55.1)	35,821 (21.5)	34,214 (20.6)	4,732 (2.8)	▲
6 Poza Rica ^a	4,000	1,355 (34.6)	316 (7.9)	95 (2.5)	2,200 (55.0)	△
7 Tamiagua ^a	129,000	31,197 (24.2)	7,290 (5.7)	7,665 (5.9)	82,847 (64.2)	★
8 Teayo	44,745	12,647 (28.2)	4,822 (10.8)	1,673 (3.8)	25,599 (57.2)	☆
9 Temapache	126,200	66,927 (53.1)	27,614 (17.9)	7,223 (5.7)	29,436 (23.3)	◇
10 Tepetzintla	24,556	9,570 (39.0)	3,597 (14.6)	7,782 (31.7)	3,607 (14.7)	□
11 Tehuacán ^a	65,200	34,253 (53.2)	7,181 (3.4)	2,955 (4.5)	5,810 (8.9)	×
12 Tuxpan	106,200	51,802 (48.8)	6,030 (5.7)	5,952 (5.6)	42,416 (39.9)	○

Note : Mark^a - measured on the map.
"Others" includes cropland, cultivatable land, wild land, and water surface etc.

(Source : V Censos Agrícola - Ganadero y Ejidal 1970, Ver)

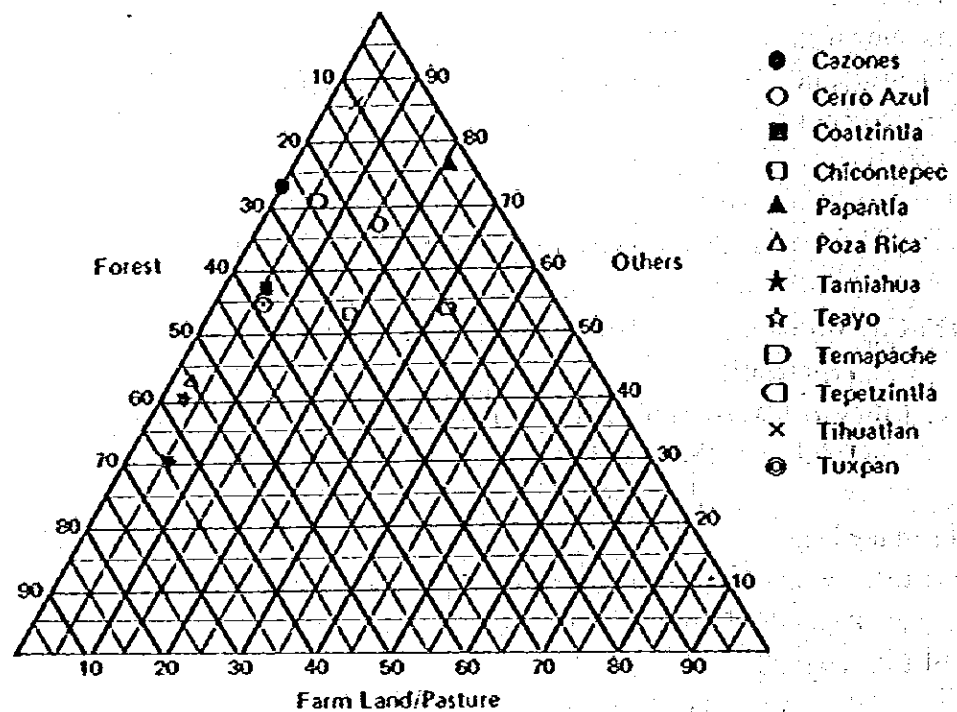


Fig. III-3-(2) Land Use Composition (1970)

3-3 Industries

Populations by economic activity are shown in Table III-3-(4) and Fig. III-3-(3), and the productive output and the amount of sales by industry are shown in Table III-3-(5) and Fig. III-3-(4), respectively. Characteristics by industrial structure of the cities in the Area are as shown below.

(1) Composition of population of economic activities

(a) Cities leaning to primary industries:

Chicontepec, Tamiahua, Tepetzintla, Temapache, Papantla, Tihuatlan and Teayo

(b) Cities leaning to secondary industries:

Poza Rica and Cerro Azul.

(c) Relatively well-balanced cities

Tuxpan, Cazones and Coatzintla

(2) Composition of output and the amount of sales

(a) Cities of a greater percentage of agriculture, forestry and stock-farming:

Cazones, Coatzintla, Tepetzintla and Teayo

(b) City of a greater percentage of industries:

Poza Rica

(c) Cities of a greater percentage of commerce and services:

Cerro Azul and Tuxpan

(3) Output and the amount of sales

(a) Great in the output of agriculture, forestry and stock-farming:

Papanla, Temapache and Tihuatlan

(b) Great in industrial output:

Poza Rica and Papanla

(c) Great in the amount of sales of commerce and services:

Poza Rica and Tuxpan

Table III-3-(4) Population of Economic Activities (1970)

(Unit: 1000 persons)

	Total Population	Population of Economic Activities	Primarys	Industries	Commerce /services	
Development Area Total	567.3	141.4 (100)	71.6 (51)	28.8 (20)	41.0 (29)	
1 Cazonos	18.2	4.6 (100)	2.0 (43)	1.1 (24)	1.5 (33)	●
2 Cerro Azul	23.4	5.7 (100)	1.2 (21)	2.2 (39)	2.3 (40)	○
3 Coatzintla	23.2	5.9 (100)	2.5 (42)	1.7 (29)	1.7 (29)	■
4 Chicontépec	46.6	11.5 (100)	10.2 (89)	0.2 (2)	1.1 (9)	□
5 Papanla	97.1	23.0 (100)	15.8 (69)	25 (11)	47 (20)	▲
6 Poza Rica	120.5	31.0 (100)	1.9 (6)	14.3 (46)	14.8 (48)	△
7 Tamiahua	24.5	6.4 (100)	5.4 (84)	0.2 (3)	0.3 (13)	★
8 Teayo	13.6	3.4 (100)	2.1 (62)	0.5 (15)	0.8 (23)	☆
9 Temapache	63.3	15.3 (100)	11.5 (75)	1.0 (7)	2.8 (18)	◇
10 Tepetzintla	10.4	2.6 (100)	2.0 (77)	0.2 (8)	0.4 (13)	◻
11 Tihuatlan	55.4	14.1 (100)	9.4 (67)	1.6 (11)	3.1 (22)	×
12 Tuxpan	71.1	17.9 (100)	7.6 (42)	3.3 (12)	7.0 (40)	⊙

Note : () shows the percentage
(Source : Agoenda Estadística 1982.)

Table III-3-(5) Industrial Structure (1975)

(Unit: 10⁶ Pesos)

	Total	Output for Primary Industries	Output for Industries	Sales Value for Commerce and Services	
Development Area Total	4,543.7	900.6 (19.8)	1,663.1 (36.6)	1,980.0 (43.6)	
1 Cazonas	62.3	55.4 (88.9)	0.7 (1.1)	6.2 (10.0)	●
2 Cerro Azul	92.6	4.6 (5.0)	5.1 (5.5)	82.9 (89.5)	○
3 Coatzintla	47.2	26.2 (55.5)	4.2 (8.9)	16.8 (35.6)	■
4 Chicontepec	85.2	74.7 (87.7)	0.2 (0.2)	10.3 (12.1)	□
5 Papantla	554.6	290.5 (52.4)	142.9 (25.8)	121.2 (21.9)	▲
6 Poza Rica	2,547.2	2.7 (0.1)	1,363.8 (53.5)	1,180.7 (46.4)	△
7 Tamiahua	45.9	27.3 (59.5)	1.2 (2.6)	17.4 (37.9)	★
8 Teayo	29.1	23.3 (80.1)	0.3 (1.0)	5.5 (18.9)	☆
9 Tezapache	320.3	166.0 (51.8)	67.5 (21.1)	86.8 (27.1)	◇
10 Tepetzintla	18.1	15.1 (83.4)	0.1 (0.6)	2.9 (16.0)	◊
11 Tihuatlan	220.4	122.0 (55.4)	35.4 (16.1)	63.0 (28.6)	×
12 Tuxpan	520.8	92.8 (17.8)	41.7 (8.0)	386.3 (74.2)	⊙

Note ; An output for agriculture is converted from the value 1969 to 1975

(Source ; VII Censo comercial 1976, X Censo Industrial 1976,
VII Censo de Servicios 1976,
V Censo Agrícola-Ganadero y Ejidal 1970,)

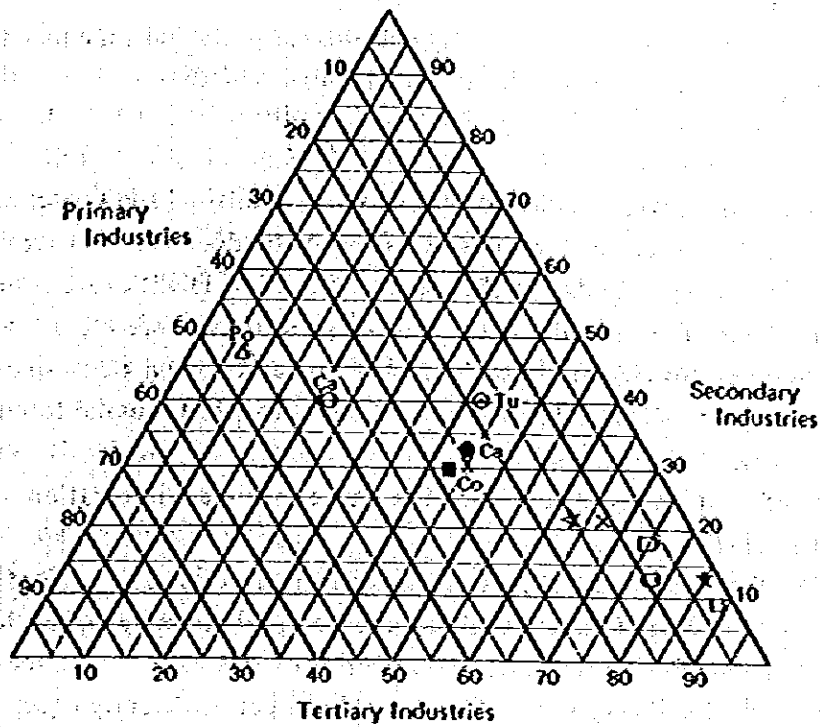


Fig. III-3-(3) Composition of Economic Activities Population (1970)

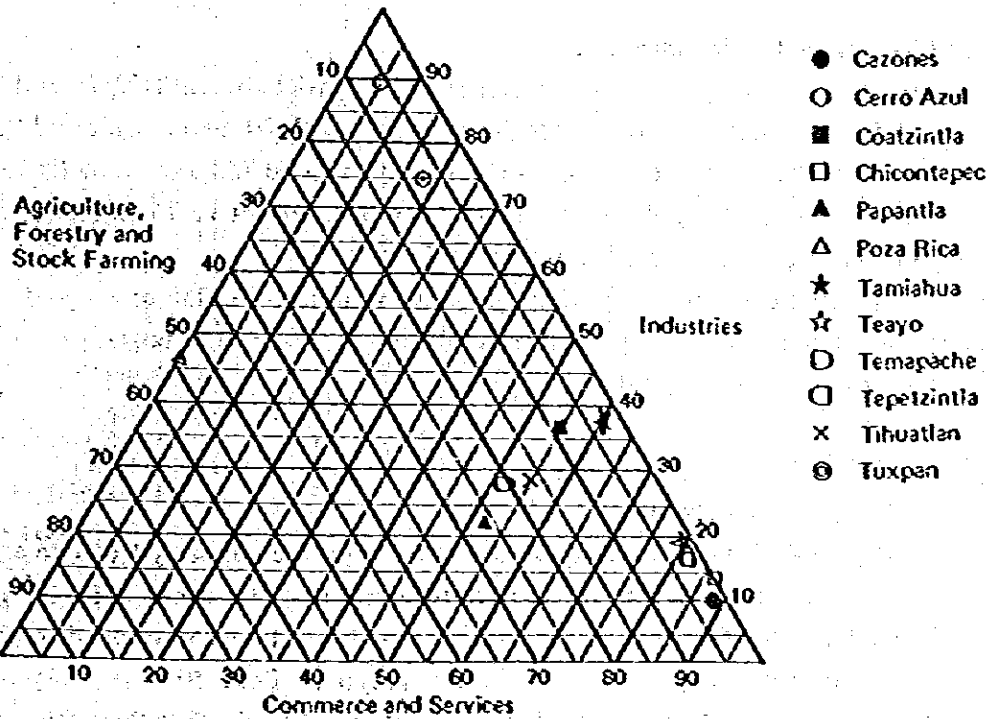


Fig. III-3-(4) Industrial Structure (1975) (Composition of Output/Yield)

3-4 Transportation

Ports, channels and watercourses, roads, railroads, airports and pipelines shall be examined here. The existing transportation network is shown in Fig. III-3-(6).

(1) Ports

The main ports in the Area are the ports of Tuxpan, Tamiahua and Cazonas. Tuxpan port has been developed in the estuary of the Tuxpan river and the dock facilities are mainly distributed along the river from Tuxpan bridge to the estuary. The dock facilities are composed of 5 public and 11 private berths. The main domestic trade cargoes in 1980 were crude oil and petroleum products and the main foreign trade cargoes were containers, construction materials and steel pipes. The total cargo handled at Tuxpan port amounts to 721 thousand ton of which about 90 percent is petroleum.

The details of port cargoes, dock facilities and existing administration and operation are described in Chapter III-4 and 5.

The ports of Tamiahua and Cazonas are small fishery ports. The haul of fish in Tamiahua fishery administration district in 1980 amounted to approximately 6,000 tons less than 9.0 percent of the Veracruz State total, even if a majority of this haul is assumed to be handled in Tamiahua port. Docks for fishery related facilities are not yet sufficiently equipped.

However, PESCA has a plan to construct an ice manufacturing plant at Tamiahua port.

Cazonas port belongs to the Tuxpan fishery administration district and it is smaller than Tamiahua port in scale.

(2) Channels and Watercourses

Tuxpan river is open for navigation and a channel between Tuxpan and Tampico has been opened for transportation of cargoes. The channel, with 20 meters wide and 98 kilo-meters long, stretches from Tuxpan to Tampico via the Tampamachoco and Tamiahua lagoons.

The channel is dredged to a minimum depth of 9 feet (2.75 m), and used exclusively by barges carrying petroleum products, steel pipes etc.

The plants extend the channel to the south Tampico – Matamoros and Tuxpan – Cazonas is now under study. The Tuxpan river is mainly used for transportation of marine and farm products to upriver residential areas.

(3) Roads

(a) Present road network

Papantla, Poza Rica, Tuxpan and Cerro Azul are connected to one another by regional trunk roads of two-lanes, but the roads connecting the other cities are in poor condition. Particularly, the fact that no satisfactory road has yet been developed to connect Tuxpan via Alamo to Chicontepec, or Castillo De Teayo to Poza Rica is a significant problem in promoting regional development. Further, it may be said that Poza Rica and Coatzintla are convenient located at a nexus of road traffic but that Chicontepec is disadvantageously located, away far from any quality roads.

(b) Condition of main roads

As shown in Table III-3-(6), route MEX-180 and the road between Tuxpan and Tamiahua

are in good condition, but the other main roads are generally not.

(c) Daily traffic volumes on main roads

Daily traffic volumes on existing main roads during 1981 are shown in Fig. III-3-(5).

The roads with the largest traffic volume are those between Tuxpan and Poza Rica, and from Poza Rica to Papantle, route MEX-180 having daily average traffic of 5000-7000 veh. The traffic is comprised of trucks (approximately 30%), passenger cars (approximately 60%) and buses (10%). It is noted that the traffic percentage of trucks is low between Tihuatlan and Alamo along route VER-127.

(d) Number of registered vehicles

The number of registered vehicles in Veracruz State is increasing year after year, however, it was only about 35.6 vehicles per 1000 persons in 1978, about one-half the rate for the whole country. However, the number of registered trucks is relatively large. (See Table III-3-(7))

(e) Traffic volume on Tuxpan Bridge

The result of a survey by type of vehicles and by month in 1979 is shown in Table III-3-(8). By type of vehicles, trucks have a relatively small traffic volume, while passenger cars make up a large percentage. The monthly traffic volume is relatively large in April and August. The monthly average is 170,869 veh/month, i.e, 239,919 veh/month converted to the equivalent passenger car units and calculated daily average is 7996 veh/day. When this value is compared with the standard traffic capacity of a two-lane road having a width of about 8.0 m, it is not expected to cause serious congestion problems.

Table III-3-(6) Road Conditions (for Main Roads)

Route	Section	Distance (km)	Pavement	Estimation				
				A	B	C	D	E
MEX-130	Tuxpan-Tulancingo (Poza Rica)	65.4	Yes	40	40	40	40	40
MEX-180	Poza Rica-Nautla	93.0	Yes	40	30	40	30	35
	Tuxpan-Cerro Azul	45.0	Yes	40	30	30	30	40
VER-127	Tihuatlan-Cerro Buque	19.0	No	25	0	25	25	25
	Potrero del Cerro Dulce-Llano	32.5	Yes	25	0	35	35	35
VER-075	Barra de Poza Rica - Cazonas	39.1	Yes	25	0	25	25	25
	Tuxpan - Yanahuá	41.0	Yes	50	-	50	50	50
	Tuxpan - La Barra	10.8	Yes	30	30	40	50	40

Note: Estimated Items

- A - Surface conditions
- B - Road sign
- C - Drain
- D - Slope
- E - Shoulder

(Source: Road Conditions, SARNP XAJAPA)

Table III-3-(7) Number of Registered Vehicles in Veracruz State

Year		1974	1975	1976	1977	1978
Type of vehicle						
Veracruz State	Cars	48,965	58,165	69,647	81,683	99,149
	Buses	1,941	2,551	2,198	2,296	2,533
	Trucks/Trailers	39,804	42,609	52,089	59,738	73,244
	Total	90,710	103,305	123,934	143,717	174,926
	Total vehicles per 1,000 inhab.	21.0	23.1	26.9	30.2	35.6
Mexico	Cars	2,053,241	2,400,930	2,580,426	2,829,110	3,359,973
	Buses	41,053	50,762	52,693	61,631	73,772
	Trucks/Trailers	728,965	887,912	987,995	1,037,144	1,278,419
	Total	2,823,259	3,339,604	3,621,114	3,927,885	4,712,164
	Total vehicles per 1,000 inhab.	51.4	58.9	61.8	65.2	75.4

(Source: Anuario Estadístico de los Estados Unidos Mexicanos 1980.)

Table III-3-(8) Traffic Volume on the Tuxpan Bridge (1979)

	Cars	Buses	Trucks/Trailers	Others	Total
Jan.	96,124	13,120	39,264	1,839	150,347
Feb.	93,185	11,492	40,017	1,808	146,502
Mar.	107,238	12,681	46,587	2,115	168,621
Apr.	140,533	13,864	44,062	2,666	200,525
May	111,984	14,778	40,834	2,296	169,892
Jun.	108,730	14,726	37,326	2,237	163,019
Jul.	123,649	15,365	38,594	2,265	179,873
Aug.	130,281	15,293	38,685	2,222	186,481
Sep.	104,206	14,752	36,227	1,972	157,157
Oct.	116,425	14,005	41,756	2,140	174,326
Nov.	118,230	13,932	38,448	2,025	172,635
Dec.	127,226	14,507	37,285	2,037	181,055
Total	1,377,811	168,515	479,085	25,022	2,050,433
Maximum	140,533	15,365	46,587	2,296	200,525
Average (Veh./month)	114,817	14,042	39,923	2,085	170,869
Share	62.2%	8.2%	23.4%	1.2%	100%
Equivalent Passenger Car Unit	1.0	3.0	2.0	1.5	
Equivalent Number of Passenger Cars	1,377,811	505,545	958,170	37,533	7,879,659
Average (Veh./month)	114,817	42,128	79,847	3,127	239,919
Average (Veh./day)	3,827	1,404	2,661	104	7,595

(Source: Traffic Data, SAHOP XALAPA)

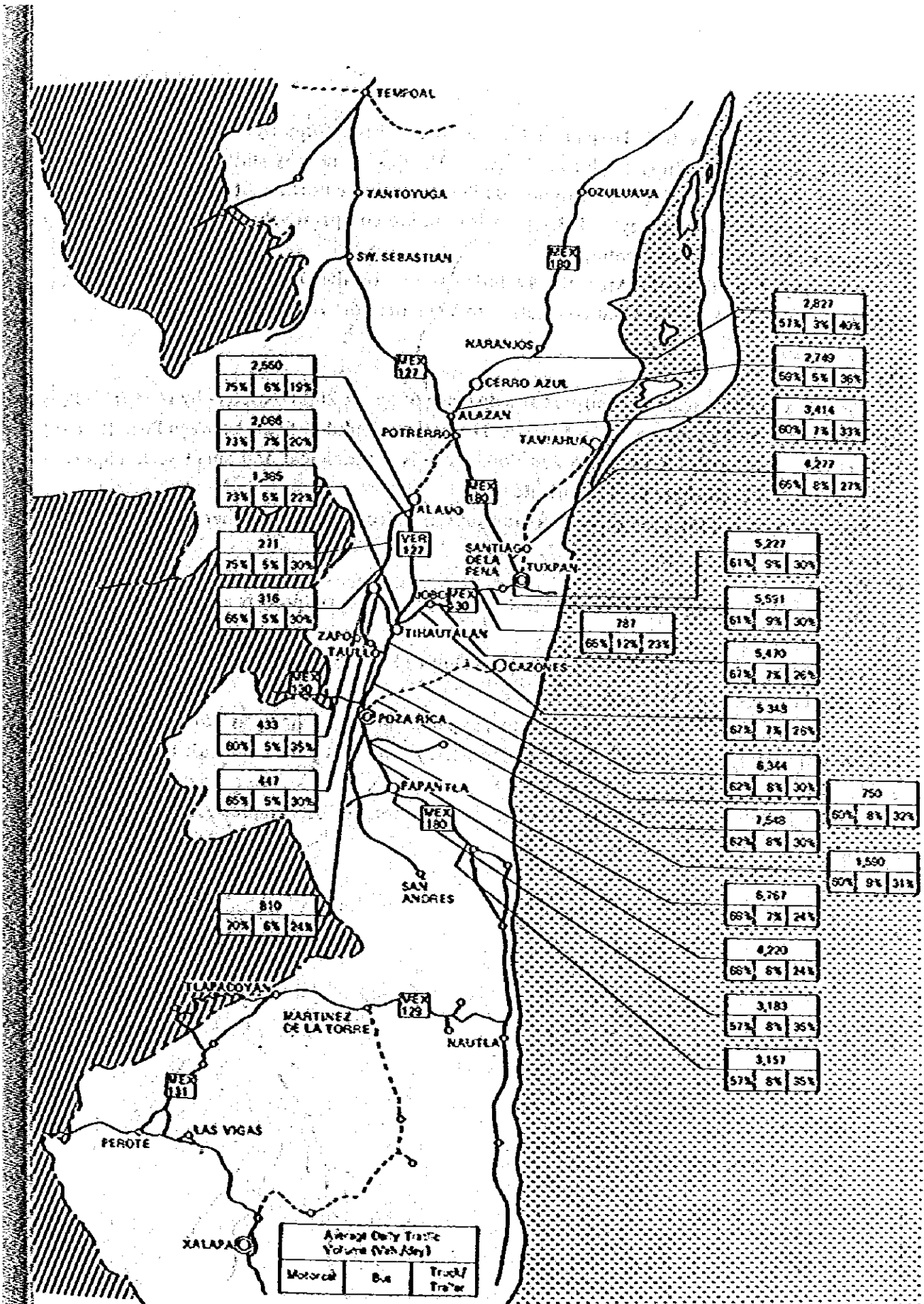


Fig. III-3(5) Daily Traffic Volume on Existing Main Roads in 1981
 (Source: Traffic Data, SAHOP XALAPA)

(4) Railroads

A spur track connecting Tuxpan and Poza Rica existed formerly but has been torn up. Therefore, there is no railway service in the Area. The nearest railway station, in Veracruz state, is Magosal station which is located in about 40 kilometers to the north-west of from Naranjos.

In Puebla state, both Honey and Beristain station are comparatively near from the Area and can reach to Mexico City via Ventoquipa.

In the region south of the Area, the Teziutlan station on the Oriental Teziutlan spur track is comparatively near to the Area and connects with Veracruz port via Jalapa.

(5) Airports

There is a medium scale local airport at a distance of about 20 kilo-meters by road from Poza Rica and about 50 kilo-meters from Tuxpan. There is a scheduled flight between Poza Rica and Mexico D.F. three times a week. In addition, there is a municipal and small scale airport in Tuxpan, which is exclusively used by private users.

Besides the above, there are some short runways in Chicontepec or another cities.

(6) Pipelines

Pipeline network for crude oil, gas and petroleum products (poli) is already shown in Fig. III-2(2).

Trunk lines for crude oil were laid along the Gulf of Mexico from Villahermosa to Monterrey by way of Poza Rica and Tampico.

A branch line was built from Poza Rica to Tuxpan. A gas trunk line was laid along the Gulf of Mexico from Cactus and Coatzacoalcos to Monterrey, and this passes through Punta de Piedra and Madero in the Area.

A branch line reaches to Poza Rica. Trunk lines for petroleum products were laid from Tuxpan to Mexico D.F. by way of Poza Rica.

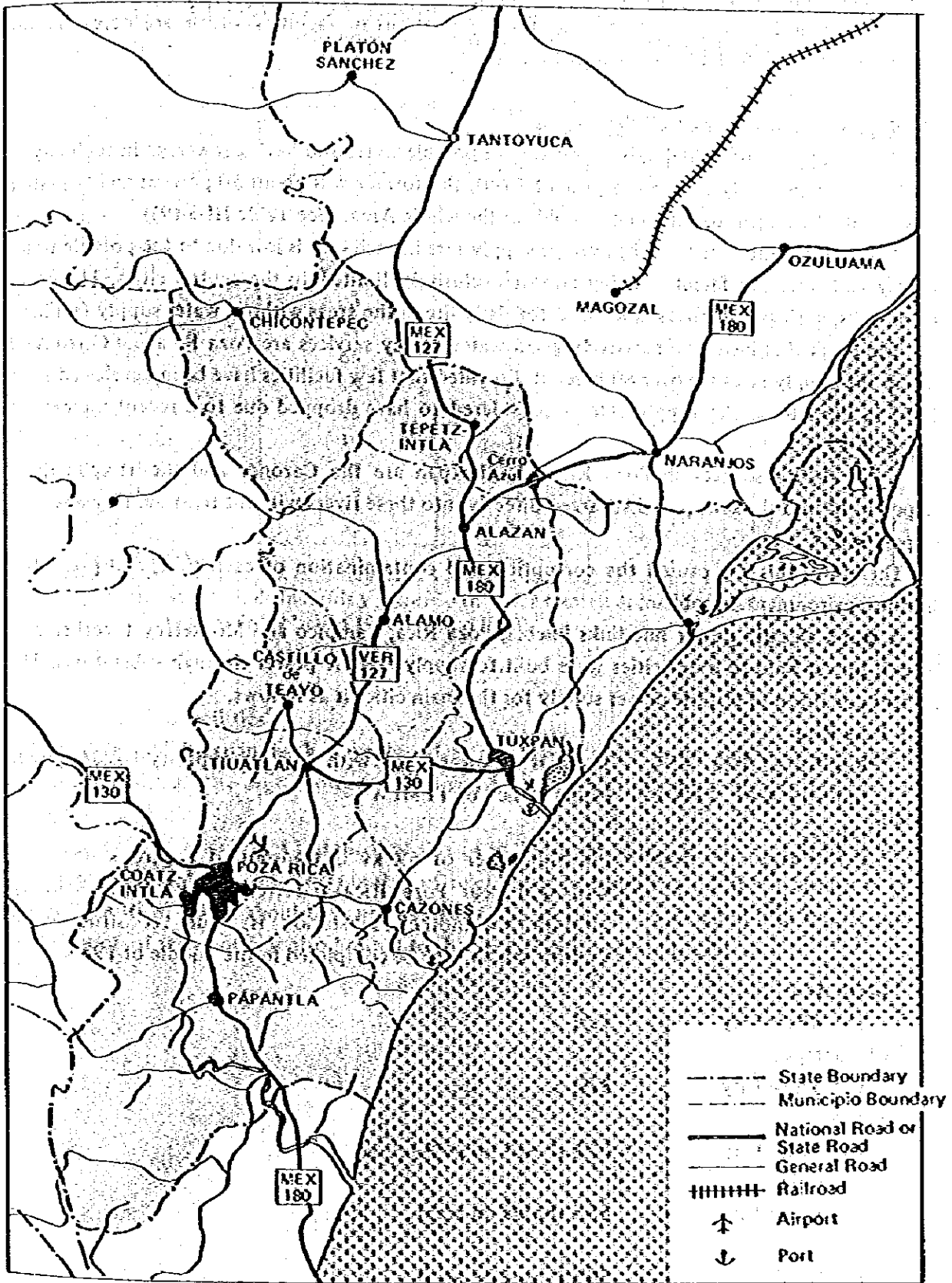


Fig. III-3-(6) Traffic Network in the Area

3-5 General View of Existing Urban Facilities

We present here a general view of fundamental urban facilities which are necessary for functional and comfortable urban activities.

(1) Supply and processing facilities

The percentage of households supplied with potable water and having sewerage in each city in the Area was generally low in the year of 1970, the former was about 50 percent and the latter was about 34 percent, based on households in the whole Area. (See Table III-3-(9)).

This reflects the fact that the average supply rate in each city is low due to the potable water supply and sewerage facilities being almost exclusively limited to the central cities. The water from wells, springs and rivers is utilized for daily life in the areas without water supply facilities.

The cities that have comparatively good water supply services are Poza Rica and Cerro Azul where the supply rates are over 80 percent. Provided that few facilities have been developed since 1970 in Poza Rica, the supply rate is considered to have dropped due to a recent increase of population.

Water supply sources in Poza Rica and Tuxpan are the Cazonas and the Tuxpan rivers respectively, and the sewage is discharged directly into these rivers without treatment by a sewage disposal plant.

Therefore, this has caused the corruption and contamination of each river, and presents a terrible environmental problem.

A trunk electric power line links Puebla, Poza Rica, Tampico and Monterrey together, and branch power lines to other cities were built to supply electric power through substations. The present condition of electric power supply for the main cities is as follows.

° Poza Rica

Residential Area	85%	There is a power plant with 117 kw capacity besides power plants owned by PEMEX
Industry Area	100%	

° Tuxpan

Urban Area	90%	Electric power of 69 kv is transmitted by trunk line from Manantial near Poza Rica and transformed to 13.8 kv by substations. Another substation is under construction in Victoria which is to be completed in the middle of 1983.
------------	-----	--

° Cerro Azul

The Whole City	30%
----------------	-----

° Chicontepec

The Whole City	37%
----------------	-----

° Teayo

The Whole City	65% (based on population)
----------------	---------------------------

° Tepetzintla

The Whole City	45% (based on area)
----------------	---------------------

° Tihuatlan

The Whole City	50% (based on area)
----------------	---------------------

**Table III-3-(9) Present Condition of Supply Processing Facilities
– Supply Rate of Water and Sewage Service (1970) –**

(Unit: %)

Cities	Supply Rate			
	Both Services	Only Water Service	Only Sewage Service	Neither of the Services
Cazones	18	8	2	71
Cerro Azul	56	24	3	17
Coatzintla	21	15	8	56
Chincontepec	3	21	3	72
Papanitla	21	21	3	55
Poza Rica	66	21	5	8
Tamiahua	16	15	7	62
Teayo	13	8	3	76
Temapache	19	27	1	53
Tepetzintla	1	22	1	76
Tihuatlan	7	15	3	75
Tuxpan	36	21	4	39
The Area Total	30	20	4	46

(Source: Secretaría de Industria y Comercio Dirección General de Estadística "IX Censo General de Población 1970" México 1970)

(2) Communication facilities

Poza Rica and Tuxpan both have broadcasting facilities and radio electric waves can be received in almost all the area. However, mail and telegraph services are limited to the cities of municipios.

The number of telephones installed, as shown in Table III-3-(10), is relatively large in Poza Rica, Cerro Azul and Tuxpan. The number of telephones installed per 1,000 inhabitants is 100 units in Poza Rica, this is about the same as Jalapa, the capital of the state but is below Veracruz city. Diffusion of telephones is also limited to the central cities of municipios.

**Table III-3-(10) Present Condition of Communication Facilities
 – Number of Telephones Installed
 (more than 1,000 telephones) –**

Cities	1970	1972	1974	1976	1978
Cerro Azul	—	—	1,167	1,215	2,248 (78)
Papantla	—	—	1,194	1,285	2,406 (20)
Poza Rica	1,503	5,062	6,883	11,369	15,388 (100)
Tuxpan	—	1,361	1,986	2,422	4,640 (55)
Jalapa	6,564	8,524	12,632	16,125	21,186 (106)
Veracruz	14,836	21,286	27,808	33,103	44,278 (161)

Note: Figures parenthesized shows the number of telephones per 1,000 inhabitants
 (Source: Agenda Estadística 1982)

(3) Educational facilities

Poza Rica and Tuxpan have colleges in the Area.

Table III-3-(11) shows that number of junior high schools and high schools are sufficient compared with the inhabitants of each city in Poza Rica, Cerro Azul, Tuxpan and Papantla.

The present distribution of national, state and private elementary schools is shown in Table III-3-(12). If the ratio of population to total classrooms is taken as for an index of sufficiency for elementary education facilities for school children Tamiahua, Chicoatepec and Cazonés which are slow in urbanization, have sufficient classrooms. On the contrary, Coatzintla, Poza Rica and Cerro Azul which are comparatively advanced in urbanization have a tendency to have insufficient classrooms. This situation indicates that new construction or improvement of elementary schools is delayed during rapid increase of population.

The average school size is large in Poza Rica and Cerro Azul. The number of school teachers for each elementary school is just same as the average of the state.

Table III-3-(11) Present Condition of Educational Facilities Distribution of National and State Schools (1978)

Cities	Kindergarten	Elementary School	Secondary School		High School	Total
			General	Technical		
Cazones	1	34	—	2	—	37
Cerro Azul	2	19	—	4	3	28
Coatzintla	2	31	—	4	—	37
Chicontepec	2	151	—	2	—	155
Papanla	2	161	2	16	1	182
Poza Rica	9	52	6	32	8	107
Tamiahua	1	55	1	1	—	58
Teayo	—	22	—	2	—	24
Temapache	2	122	—	7	2	135
Tepetzintla	1	18	1	1	—	21
Tehuacan	5	83	1	7	—	96
Tuxpan	7	105	7	5	2	126
The Area Total	34	853	20	83	16	1,006

(Source: Compendio Estadístico)

Table III-3-(12) Present Condition of Educational Facilities Present Condition of Elementary School (1980)

Cities	Elementary School				Evaluation Index			
	No. of Schools (Unit)	No. of Students (Person)	No. of Class Rooms (Unit)	No. of Teachers (Person)	Population per Class Room	No. of Class Rooms per School	No. of Students per Teacher	No. of Students per Class Room
Cazones	34	3,458	200	125	105	5.9	44	27
Cerro Azul	20	6,562	193	165	157	9.7	50	34
Coatzintla	10	673	41	18	739	4.1	37	16
Chicontepec	166	10,635	549	302	102	5.4	35	19
Papanla	162	30,730	1,017	644	122	6.3	49	30
Poza Rica	61	34,331	853	830	169	14.0	41	40
Tamiahua	56	6,336	318	158	92	5.7	43	29
Teayo	25	3,863	143	68	117	5.7	44	27
Temapache	133	27,018	849	511	106	6.4	43	26
Tepetzintla	18	3,004	109	70	113	6.1	43	28
Tehuacan	91	17,545	609	429	111	6.7	41	29
Tuxpan	112	22,659	795	554	111	7.1	41	29
The Area Total	828	163,915	5,655	3,884	128	6.2	42	29
Veracruz State	6,232	1,053,455	39,734	25,447	132	6.4	43	27

Note: Number of schools includes national, state and private elementary schools.

Number of students are limited to registrants.

(Source: Compendio Estadístico 1980)

(4) Medical facilities

The condition of medical facilities in 1978, as shown in Table III-3-(13), is examined, using a comparative method, by the number of doctors and sickbeds.

The number of doctors per population, which varies widely by the city, is above the state (1971) and the national (1975) averages in only three cities, Poza Rica, Cerro Azul and Tuxpan. However, number of doctors in other cities, especially Teayo, Temapache, Chicontepec, Tihuatlan, Cazonas, is quite low.

Meanwhile, the number of sickbeds is generally low and only Tuxpan is close to the average of the state, though still but inferior to the level of the nation. It is an objective to construct hospitals and to increase the number of sickbeds for the main three cities of Poza Rica, Tuxpan and Cerro Azul.

Table III-3-(13) Present Condition of Medical Facilities
- Medical Facilities and Medical Staff (1978) -

Cities	Facilities		Medical Staff				Evaluation Index	
	No. of Hospital	No. of Sick Beds	No. of Doctors	No. of Assistants	No. of Nurses	No. of Midwives	Population per Doctor	No. of Sick Beds per 10,000 Inhabitants
Cazonas	1	3	2	1	0	0	10,200	1.5
Cerro Azul	2	0	30	6	0	0	565	0
Coateixtla	1	3	9	1	0	0	3,211	1.0
Chicontepec	2	8	2	0	0	0	27,770	1.4
Papantla	4	49	21	5	14	40	5,670	4.4
Poza Rica	4	127	407	22	83	62	377	8.3
Tantahuca	1	6	3	1	0	0	9,407	2.1
Teayo	1	3	0	1	0	0	-	1.9
Temapache	3	8	1	3	0	32	84,490	0.9
Tepehualtlan	-	-	-	-	-	-	-	-
Tihuatlan	1	0	3	1	1	0	21,690	0
Tuxpan	4	102	56	6	28	29	1,518	12.0
The Area Total	23	309	534	47	126	143	1,305	4.4
Veracruz State	362	5,943	2,310	-	-	-	1,564	12.6
Mexico	5,665	92,974	36,856	-	-	-	1,422	15.3

Note : Data concerning Veracruz state and Mexico are in 1971 and 1975, respectively.
(Source: Manual de Estadísticas Básicas Sociodemográficas III Sector Salud y Seguridad Social, C/1)

(5) Commercial facilities

General commercial facilities such as retail shops for food, clothes and household articles etc. are overwhelmingly concentrated in Poza Rica. (See Table III-3-(14)).

The number of facilities, total income and added value in Poza Rica are respectively 40%, 64% and 62% of the whole Area figures. The concentration of facilities in proportion to population is at a higher level than the national average. This clearly indicates its character as a commercial city, as well as an industrial city, due to PEMEX. Added value per commercial facility is a little less than the national average. Cities next to Poza Rica having high concentration of such facilities are Papanila, Tuxpan and Cerro Azul, Cerro Azul having greatest per capita concentration. Tuxpan is the leader in the added value per commercial facility. On the contrary, Chicontepec, Tepetzintla and Temapache have low concentrations of retail facilities.

As can be seen in Table III-3-(15), service facilities such as restaurants and hotels etc. are also concentrated in Poza Rica.

Poza Rica has a dense concentration of service facilities in proportion to population but the added value per facility is less than 50 percent of the national average. Tuxpan, Papanila and Tihuatlan follow Poza Rica in the concentration of service facilities but in proportion to population Cerro Azul and Tuxpan have a very high density. Tuxpan is at the same level as Poza Rica in added value per facility.

Table III-3-(14) Present Condition of Commercial Facilities
(a) Commerce (1975)

Cities	Present Condition				Evaluation Index		
	No. of Shops (unit)	No. of Participants (person)	Total Proceeds (10 ⁴ pesos)	Added Value (10 ⁴ pesos)	Population per Shop (Person/unit)	No. of Participants per Shop (Person/unit)	Amount of Added Value per Shop (10 ³ pesos/unit)
Cerroces	121	176	4.8	1.3	162	1.5	10.6
Cerro Azul	250	507	73.3	21.2	107	2.0	25.7
Coahuatla	97	191	15.3	4.1	276	2.0	42.2
Chicontepec	80	129	8.9	2.3	652	1.6	28.9
Papanila	800	1,212	103.1	29.7	139	1.5	37.1
Poza Rica	1,842	4,112	1,066.1	295.0	77	2.2	160.2
Tamias	143	254	12.7	3.3	188	1.8	23.1
Tuyo	54	69	4.7	0.9	280	1.3	16.0
Temapache	249	397	76.9	18.0	307	1.6	72.3
Tepetzintla	31	65	1.7	0.3	366	2.1	10.8
Tihuatlan	298	592	46.8	11.5	266	2.0	38.6
Tuxpan	593	1,385	328.6	86.1	133	2.3	143.7
The Area Total	4,563	9,669	1,673.9	473.7	167	2.0	103.8
Texas State	29,491	62,472	14,216.7	3,857.5	154	2.1	130.6
Mexico	475,264	1,318,028	328,553.7	89,919.4	122	2.6	159.2

(Source: VII Censo Comercial 1976 a Nivel Entidad Federativa, Municipio, Grupo de Actividad)

Table III-3-(15) Present Condition of Commercial Facilities
(b) Service Industry (1975)

Cities	Present Condition				Evaluation Index			
	No. of Service Shops (Unit)	No. of Participants (Person)	Total Proceeds (10 ⁶ pesos)	Added Value (10 ⁶ pesos)	Population per Service Shop (Person/Unit)	No. of Participants per Service Shop (Person/Unit)	Amount of Added Value per Service Shop (10 ⁶ pesos/unit)	
Coxcomulco	39	55	1.4	0.5	502	1.4	12.0	
Cerro Azul	182	377	9.6	5.3	148	2.1	29.1	
Coahuatlan	33	56	1.5	0.6	811	1.7	19.4	
Chicontepec	31	56	1.4	0.4	1,683	1.8	12.6	
Papantla	283	472	18.1	9.9	392	1.7	35.1	
Pozza Rica	957	2,403	114.6	71.0	147	2.5	74.2	
Tamiahua	67	108	4.7	2.0	400	1.6	29.6	
Teayo	23	26	0.8	0.2	657	1.1	7.4	
Temapacho	117	207	9.9	4.5	654	1.8	38.7	
Tepehuan	21	46	1.2	0.4	540	2.2	18.0	
Tehuacan	208	389	16.2	6.4	295	1.9	30.7	
Tehuacan	410	920	57.7	30.4	195	2.2	74.2	
The Area Total	2,371	5,073	237.1	131.6	273	2.1	55.5	
Veracruz State	17,985	34,383	2,388.9	1,426.0	303	2.3	95.2	
Mexico	221,974	712,609	62,576.3	36,171.3	260	3.2	163.0	

(Source: VII Censo de Servicios 1976 a Nivel Entidad Federativa, Municipio y Grupo de Actividades.)

(6) Residential facilities

Except for the urban areas of Poza Rica and Tuxpan, most of the dwellings are made of wood or brick or thatch and have earth floors. Residences in the above cities are made of reinforced concrete but the walls are generally made of bricks. Number of rooms per residence in the year of 1970, is shown in Table III-3-(16), 77% having only one or two rooms. Cities in which residences with more than three rooms exceed 30 percent are Poza Rica, Cerro Azul and Tuxpan. Coatzintla follows the above cities in number of rooms per residence.

**Table III-3-(16) Present Condition of Dwelling Facilities
– Average Number of Rooms per Dwelling House (1970) –**

(Unit: %)

Cities	No. of Rooms					
	1	2	3	4	More than 5	More than 3
Cazones	58	29	10	2	1	14
Cerro Azul	35	32	17	8	8	33
Coatzintla	48	25	13	7	7	27
Chicontepec	65	26	5	2	2	9
Papanitla	52	28	11	5	4	20
Poza Rica	33	29	15	10	13	38
Tamiahua	61	25	10	3	1	14
Teayo	63	24	8	4	1	13
Temápache	53	31	8	5	3	16
Tepetzintla	74	19	4	2	1	7
Tihuatlan	61	26	8	3	2	13
Tuxpan	46	24	12	11	7	30
The Area Total	50	27	11	6	6	23

(Source: IX Censo General de Poblacion, 1970)

As a result of general view of urban facilities for major cities, the following conclusions appear: Poza Rica, Tuxpan and Cerro Azul are comparatively sufficient in the accumulation of fundamental urban facilities. Poza Rica is the best supplied among the above three cities and keeps up appearances as a modern city. Tuxpan is comparatively sufficient in the supply of facilities and a calm and peaceful town. Fundamental urban facilities in the Tuxpan urban area do not seem to be under a bias. The supply of the urban facilities in Cerro Azul seems to be sufficient for city scale but not so large.

However, it is necessary to fill out the fundamental urban facilities in order to accomplish functional, comfortable and convenient urban activities.

Urban Operational Facilities

1) Supply and processing facilities

Water Supply facilities, Sewerage, Drainage, Electric power supply facilities, Sewage disposal plant, Garbage disposal plant, etc.

2) Transport facilities

Bus terminal, Distribution business facilities, etc.

3) Communication facilities

Telephone-telegram-mail offices, Broadcasting station, etc.

Educational and Cultural Facilities

1) Higher educational facilities

2) Cultural facilities

Welfare and Medical Facilities

1) Medical facilities

General hospitals, Special hospitals, Regional health centers, Clinics, etc.

2) Sport facilities

3) Social protection facilities

Facilities for physically handicapped persons, Home for the aged, Rehabilitation centers

Industrial Facilities

1) Exclusive industrial facilities

Residencial Facilities

1) Detached houses

2) Multiple dwelling houses

3-6 Present Characteristics of the Respective Cities

(1) Cazonas

Cazonas is a city located in the estuary of the Cazonas River. The economically active population is fairly evenly distributed between the primary, secondary and tertiary industries, but the output is characterized by agriculture, forestry and stock-farming. However, it is small in the absolute value. Farm land and pasture constitute the main uses of land. Thus, fundamentally, Cazonas is a city with an economy based on agriculture. In terms of transport and geography, it is under the influence of Poza Rica. Accumulation of urban facilities is insufficient, the medical facilities are in especially poor condition. Number of elementary schools is deemed to be sufficient.

(2) Cerro Azul

Cerro Azul is located at the north end of the Area and is at a relatively high altitude. The land is used mainly for farm land and pasture, but the population involved in economic activity is inclined to secondary industry. In output and sales value, the municipio is characterized by the commerce and services but the absolute values are small. The population density is relatively high, and so is the rate of concentration of population in the central city. This city is generally sufficient in accumulation of urban facilities but a little insufficient in sewerage and elementary schools.

(3) Coatzintla

The population involved in economically active population is not under a bias to the primary, secondary or tertiary industry, but when the output is considered, agriculture, forestry and

stock-farming constitute a large percentage, although the absolute value is small. Because of the small area of the city, the population density is rather high, but even though the population is not great. In the case transport and geography as well as economic activity, the influence of Poza Rica is strong. Urban facilities are under supplied and are in poor condition.

(4) Cincontepec

This City is located relatively deep in the interior and at the high altitude of 300 – 500 m. Consequently, the mean temperature is relatively low. It is far behind in the development of a road network. In looking at both economically active population and the output of the city agriculture, forestry and stockfarming are the main factors and the economic base is clearly in agriculture. Excepting elementary schools, this city is generally insufficient in accumulation of urban facilities especially in water supply and medical facilities.

(5) Papantla

The percentage of the population involved in economic activity as well as the output of this city are not so large but, in the absolute value of output, the agriculture, forestry and stock-farming are the first in the Area. Farm land and pasture constitute the main land uses. The forest area is also relatively large. The city area is the largest and includes the upstream region of the Tecolutla River. As for the output of the food industry, the city is the largest in the Area. But, basically, it is a city of agricultural production. The population is second to Poza Rica, and in transport/geography, it is connected closely to Poza Rica.

Although it is generally far behind in the development of urban facilities, number of junior high schools, high schools and service facilities are comparatively sufficient.

(6) Poza Rica

Poza Rica is the center for the industries and the commerce and services in the Area. It includes a PEMEX base which is not of a large scale. It is high in population and population density but is the smallest in city area. It is located at the junction of the National Highways 180 and 130 (Ruta MEX-180 and MEX-130) and is thus a strategic transportation point. It has the most developed urban facilities in the Area and keeps up appearances as a modern city. Especially commercial facilities are extremely numerous in part as a result of the profits. On the contrary, medical facilities, particularly the number of sickbeds, and the number of elementary schools are insufficient.

(7) Tamiahua

This city is located at the north end of the Area and faces the Gulf of Mexico. The population involved in economic activity is under a bias to the primary industry, and the fishing sector is relatively active, along with the agriculture, forestry and stock-farming sectors. There is much land left unused, including water surface. The transport conditions are not good. All urban facilities are undeveloped and in poor condition except elementary schools.

(8) Teayo

The output of agriculture, forestry and stock-farming is high in percentage but not in the

absolute value. The transport conditions are not so bad, but the city is away from the regional trunk roads in the Area. The population is low.

It is far behind in the development of all urban facilities, particularly water supply and medical facilities.

(9) Temapache

The population of this city has recently been increasing at a rate higher than that of the State or Nation. Both output and land use are characterized by agriculture, forestry and stock-farming so that Temapache may be said to be a city of agricultural production second to Papantla. With the road development lagging, the transport condition is not good. It has a large city area. Urban facilities accumulation is generally insufficient, particularly the medical facilities are in poor condition.

(10) Tepetzintla

The population is the smallest among the cities in the Area. The output is inclined to the primary industries of agriculture, forestry and stockfarming, though it has a small in the absolute value. The forest area is relatively large. All urban facilities development is rather delayed.

(11) Tihuatlan

This city occupies a central position in the Area and is located midway between Poza Rica and Tuxpan. Tihuatlan city has the National Highway 130 running through it and is thus situated well for transport. The economically active population, output and land use, the percentages of agriculture, forestry and stock-farming are relatively high. All urban facilities are undeveloped and in poor condition, especially, water supply and medical facilities.

(12) Tuxpan

This city is situated in the flat land lying in the estuary of the Tuxpan River, and hills of a height exceeding 100 m are located here and there in the south-western part of the city area. The annual population increase between 1970 and 1980 was low, being 2.2 percent. However, as the rate of concentration of population in the central city has been decreasing recently, it seems that the population is increasing in the area exclusive of Ciudad. The land use consists mainly of farmland and pasture, but the population involved in economic activity is well balanced between the primary, secondary and tertiary industries. In the aspects of output and sales value, it is characterized by commerce and services. The transport condition is relatively good, as a private airport is located there and also the National Highways 130 and 180 are available. Accumulation of urban facilities is by no means satisfactory but is second to Poza Rica.

4. General View of Cargo Traffic

4-1 Total System of Cargo Traffic

As for the modal split of cargo traffic in the nation in 1980, road transportation had the largest share, 61 percent of the total tonnage, as shown in Table III-4-(1). Marine transportation was second.

Based on ton-kilometer, marine transportation had the largest value, because it included both domestic and foreign trade.

The share of the marine transportation in 1980 was 25.2 percent of the total tonnage, but when considering only the domestic trade, it was about 14 percent.

Table III-4-(1) Cargo Traffic System in Mexico

Base	Mode	1970	1975	1978	1979	1980	Remarks
Tonnage (Million tons)	Railway	47.3	63.2	69.4	67.2	69.8	
	Marine	32.7	65.7	74.0	96.0	124.6	Foreign and domestic
	Air	0.0	0.1	0.1	0.2	0.2	"
	Road	—	—	251.7	279.0	299.6	
	Total	—	—	395.2	442.4	491.2	
Ton- kilo- meter (Million ton-km)	Railway	23,083	33,400	36,713	36,728	42,880	
	Marine	—	—	118,507 (10,147)	150,480 (13,590)	169,324 (20,322)	estimated () ; do- mestic trade
	Air	88	142	174	189	202	
	Road	—	—	75,510	84,260	91,600	
	Total	—	—	230,904	271,657	304,006	

Note: Parts of 1980 data are estimated.

— ; no available data

(Source: SCT)

This reflects remarkably the characteristic of industrial distribution in Mexico that the industrial functions are concentrated in the inland metropolitan area, while in the coastal zones industrial functions are very few.

However, it can be foreseen that the share of marine transportation, especially domestic transportation will grow much higher, keeping pace with the progress of industrial development in the coastal zones.

4-2 Port Activities

The volume of cargoes handled at all Mexican ports recorded a remarkable increase from 65 million tons in 1975 to 125 million tons in 1980, as shown in Table III-4-(2). This is because the exports of crude oil grew much larger.

Table III-4-(2) Volume of Port Cargoes (1975-1980)

(Unit: 1,000 Tons)

	Total	Foreign Trade			Domestic Trade		
		Imp.	Exp.	Total	In.	Out.	Total
1975	64,644 (49,219)	8,708 (6,006)	15,041 (9,518)	23,749 (15,524)	21,734 (18,212)	19,160 (15,483)	40,895 (33,695)
1976	67,435 (47,251)	7,158 (4,495)	15,109 (9,883)	22,268 (14,379)	25,694 (17,455)	19,474 (15,416)	45,168 (32,872)
1977	63,437 (40,498)	8,314 (5,985)	20,840 (14,692)	29,154 (20,677)	19,970 (10,074)	14,313 (9,746)	34,283 (19,821)
1978	75,503 (49,432)	10,103 (6,601)	30,010 (23,135)	40,112 (29,736)	20,839 (9,898)	14,552 (9,798)	35,391 (19,696)
1979	96,036 (65,770)	10,938 (6,923)	39,773 (31,778)	50,711 (38,700)	26,034 (13,338)	19,291 (13,731)	45,325 (27,069)
1980	124,576 (87,657)	13,520 (8,932)	52,536 (44,695)	66,056 (53,627)	33,305 (17,417)	25,215 (16,613)	58,520 (34,030)

Note: () belongs to the Gulf ports
(Source: SCT)

The share of marine transportation was over 90 percent of the total exports of the nation in 1980, and was about 60 percent of the total imports as shown in Table III-4-(3).

The cargo volume handled at Tuxpan port and its surrounding ports – Tampico, Veracruz and Coatzacoalcos – is shown in Tables III-4-(4), (5), (6) and (7) respectively.

Tuxpan port recorded 7.21 million tons in 1980, and Tampico 12.64 million tons, Veracruz 6.83 million tons and Coatzacoalcos 2.40 million tons.

But as for foreign trade, Tuxpan port recorded 0.61 million tons in 1980, and Tampico 3.76 million tons, Veracruz 3.78 million tons and Coatzacoalcos 2.40 million tons.

Tuxpan port handled a relatively large total cargo volume, but very little foreign trade.

Table III-4(3) Foreign Trade Cargoes by Marine Transportation (1979 - 1980)

(Unit: 1,000 Tons)

	Foreign Trade Cargoes			Foreign Trade Cargoes by Marine Transportation		
	Imp.	Exp.	Total	Imp.	Exp.	Total
1970	8,865	14,183	23,048	3,376 (38.1)	9,705 (68.7)	13,081 (58.8)
1971	8,949	14,587	23,536	3,908 (43.7)	10,883 (74.6)	14,791 (62.8)
1972	11,565	15,874	27,439	5,635 (48.7)	11,314 (71.2)	16,949 (61.7)
1973	16,974	14,005	30,979	9,499 (55.9)	11,286 (80.5)	20,785 (67.0)
1974	16,907	16,501	33,408	8,247 (48.7)	12,767 (77.3)	21,014 (62.9)
1975	15,782	16,883	32,665	8,708 (55.1)	15,041 (89.0)	23,749 (72.7)
1976	11,353	17,604	28,957	7,158 (63.5)	15,110 (85.8)	22,268 (76.9)
1977	12,934	22,445	35,379	8,314 (64.2)	20,840 (92.8)	29,154 (82.4)
1978	14,720	33,670	48,390	10,103 (68.6)	30,010 (89.1)	40,113 (82.9)
1979	17,930	43,020	60,950	10,938 (61.0)	39,773 (92.4)	50,711 (83.2)
1980	23,404	56,817	80,221	13,520 (57.8)	52,536 (92.4)	66,056 (82.3)

Note: () ; Percent to the national total
(Source: SCT)

Table III-4(4) Volume of Cargoes of Tuxpan (1975 - 1980)

(Unit: 1,000 Tons)

	Total	Foreign Trade			Domestic Trade		
		Imp.	Exp.	Total	In.	Out.	Total
1975	7,950	625	16	640	7,305	4	7,309
1976	6,012	226	20	247	5,762	3	5,765
1977	1,569	50	23	73	1,318	179	1,497
1978	2,350	232	153	385	343	1,622	1,965
1979	3,180	234	162	397	651	2,133	2,784
1980	7,208	550	63	614	5,971	623	6,594

(Source: SCT)

Table III-4-(5) Volume of Cargoes of Tampico (1975 - 1980)
(Unit; 1,000 Tons)

	Total	Foreign Trade			Domestic Trade		
		Imp.	Exp.	Total	In.	Out.	Total
1975	9,669	1,648	1,762	3,410	4,680	1,578	6,258
1976	10,568	1,424	2,149	3,573	5,700	1,295	6,996
1977	9,449	1,582	2,307	3,889	4,928	632	5,560
1978	9,585	1,668	1,971	3,639	5,181	765	5,946
1979	12,826	1,450	1,935	3,384	8,122	1,320	9,442
1980	12,640	2,033	1,729	3,762	6,192	2,686	8,878

(Source; SCT)

Table III-4-(6) Volume of Cargoes of Veracruz (1975 - 1980)
(Unit; 1,000 Tons)

	Total	Foreign Trade			Domestic Trade		
		Imp.	Exp.	Total	In.	Out.	Total
1975	4,788	1,544	625	2,168	2,563	56	2,619
1976	4,340	1,283	496	1,780	2,471	88	2,560
1977	4,075	1,848	605	2,453	1,611	11	1,622
1978	5,147	2,183	626	2,809	2,333	5	2,337
1979	5,939	2,758	557	3,316	2,622	1	2,623
1980	6,832	3,413	369	3,782	3,010	40	3,050

(Source; SCT)

Table III-4-(7) Volume of Cargoes of Coatzacoalcos (1975 - 1980)

(Unit; 1,000 Tons)

	Total	Foreign Trade			Domestic Trade		
		Imp.	Exp.	Total	In.	Out.	Total
1975	2,905	693	1,549	2,241	662	1	663
1976	2,016	308	1,169	1,477	534	5	538
1977	2,648	968	1,222	2,190	458	0	458
1978	2,763	982	1,449	2,431	332	1	333
1979	2,863	842	1,450	2,292	557	13	570
1980	3,076	1,135	1,262	2,396	601	79	680

(Source; SCT)

The cargo volumes by commodity type handled at above four ports are shown in Tables III-4-(8), (9), (10) and (11) respectively. At Tuxpan port, the unloaded cargo volume of domestic crude oil and petroleum is very large and the foreign trade cargo volume is very small, but much attention has to be paid to the high containerization ratio which is defined as the ratio of container cargo volume to general cargo volume.

At Tampico port, unloaded cargo volume of domestic petroleum is very large and the exported volume of mineral products is striking.

Table III-4-(8) Cargo Volume of Tampico by Commodity Type (1980)

(Units: 1,000 Tons)

Commodity	Total Imp. In	1st			2nd			3rd			Exp. + Out.	4th		
		Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume		Commodity Volume	Commodity Volume	Commodity Volume
General	266	201	149	31	12	63	12	63	63	63	63	63	63	
Agriculture	152	152	96	56	5	-	-	-	-	-	-	-	-	
Mineral	197	197	197	-	-	-	-	-	-	-	-	-	-	
Petroleum and related products	-	-	-	-	-	-	-	-	-	-	-	-	-	
Others	-	-	-	-	-	-	-	-	-	-	-	-	-	
Perishables	614	550	-	-	-	-	-	-	-	-	-	-	-	
Total	623	623	623	623	623	623	623	623	623	623	623	623	623	
General	623	623	623	623	623	623	623	623	623	623	623	623	623	
Agriculture	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mineral	-	-	-	-	-	-	-	-	-	-	-	-	-	
Petroleum and related products	6,552	5,592	6,552	3,643	284	600	600	600	600	600	600	600	600	
Others	-	-	-	-	-	-	-	-	-	-	-	-	-	
Perishables	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	6,594	5,971	6,594	3,643	284	600	600	600	600	600	600	600	600	
General	6,594	5,971	6,594	3,643	284	600	600	600	600	600	600	600	600	
Agriculture	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mineral	-	-	-	-	-	-	-	-	-	-	-	-	-	
Petroleum and related products	6,552	5,592	6,552	3,643	284	600	600	600	600	600	600	600	600	
Others	-	-	-	-	-	-	-	-	-	-	-	-	-	
Perishables	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	6,594	5,971	6,594	3,643	284	600	600	600	600	600	600	600	600	

(Source: SCT)

Table III-4-(9) Cargo Volume of Tampico by Commodity Type (1980)

(Units: 1,000 Tons)

Commodity	Total Imp. In	1st			2nd			3rd			Exp. + Out.	4th		
		Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume		Commodity Volume	Commodity Volume	Commodity Volume
General	1,303	633	125	117	77	470	157	44	35	470	157	44	35	
Agriculture	366	346	217	129	33	-	-	-	-	-	-	-	-	
Mineral	1,557	586	99	46	97	971	253	188	155	971	253	188	155	
Petroleum and related products	516	264	69	62	37	252	92	43	41	252	92	43	41	
Others	35	5	-	-	-	-	-	-	-	-	-	-	-	
Perishables	3,762	2,033	-	-	-	-	-	-	-	-	-	-	-	
Total	6,633	4,261	6,633	3,762	2,033	4,261	3,762	2,033	2,033	4,261	3,762	2,033	2,033	
General	6,633	4,261	6,633	3,762	2,033	4,261	3,762	2,033	2,033	4,261	3,762	2,033	2,033	
Agriculture	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mineral	6,633	4,261	6,633	3,762	2,033	4,261	3,762	2,033	2,033	4,261	3,762	2,033	2,033	
Petroleum and related products	6,229	6,164	6,229	6,164	6,229	6,164	6,229	6,164	6,229	6,164	6,229	6,164	6,229	
Others	-	-	-	-	-	-	-	-	-	-	-	-	-	
Perishables	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	6,633	4,261	6,633	3,762	2,033	4,261	3,762	2,033	2,033	4,261	3,762	2,033	2,033	

(Source: SCT)

Table III-4-(10) Cargo Volume of Veracruz by Commodity Type (1980)

(Unit: 1,000 Tons)

Commodity	Total Imp., In	1st			2nd			3rd			Exp., Out.	1st			2nd			3rd			
		Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume		Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	
General	1,459	1,311	164	152	139	148	139	148	139	148	139	148	139	148	139	148	139	148	139	148	
Foreign Trade																					
Iron			164																		
Mineral																					
Petroleum and related products																					
Others																					
Domestic Trade																					
Iron																					
Mineral																					
Petroleum and related products																					
Others																					
Total	1,459	1,311	164	152	139	148	139	148	139	148	139	148	139	148	139	148	139	148	139	148	

(Source: SCT)

Table III-4-(11) Cargo Volume of Coatzacoalcos by Commodity Type (1980)

(Unit: 1,000 Tons)

Commodity	Total Imp., In	1st			2nd			3rd			Exp., Out.	1st			2nd			3rd			
		Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume		Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	Commodity Volume	
General	496	457	188	94	84	41	84	41	84	41	84	41	84	41	84	41	84	41	84	41	
Foreign Trade																					
Steel			188																		
Mineral																					
Petroleum and related products																					
Others																					
Domestic Trade																					
Steel																					
Mineral																					
Petroleum and related products																					
Others																					
Total	496	457	188	94	84	41	84	41	84	41	84	41	84	41	84	41	84	41	84	41	

Veracruz port has the significant characteristics that the unloaded cargo volume of domestic petroleum and import cargo volume of iron, steels and cereals are very large, but there is almost no export cargo volume.

At Coatzacoalcos port, the domestic cargo volume is very small, but the import cargo volume of steel tubes and cereals and the export cargo volume of liquid sulphur are very large.

The countries contributing to Tuxpan's foreign trade are shown in Table III-4-(12). The USA had the largest share, at 84 percent of Tuxpan's total import cargo in 1980, and West Germany had the largest share, at 47 percent, of the total export cargo.

The container cargo volume at Tuxpan was recorded at 167 thousand tons in 1980, second to Veracruz, as shown in Table III-14-(13). In Tuxpan, 40' containers are most commonly handled and the export of empty containers is relatively large. So Tuxpan port can be easily regarded as one of the most important container handling ports.

4.3 Inland Port Cargo Traffic

Inland port cargo traffic between a port and its hinterland is one of the most important factors for analysing the characteristics of the port. In this study, the inland port cargo traffic of Tuxpan, Tampico, Veracruz and Coatzacoalcos will be investigated.

The cargo traffic of the four ports for 1975 are shown in Table III-4-(14), (15), (16) and (17) as import, export, inward and outward cargo flows respectively.

The railway share of the inland transportation for imported cargo was relatively large except at Tuxpan from which no railway could be found. The inland destination was usually in the Mexico City metropolitan area.

Railways also had an advantageous share of the inland export cargo traffic, but the road share was much larger than in the case of imports.

The inland origins of cargo shipped to Tampico were in the north-eastern states of Mexico, but the other three ports had inland origins in the state just behind each port.

As for the domestic trade, the cargoes are mostly various kinds of petroleum and petrochemical products, and the centers of cargo traffic are Coatzacoalcos, Pajaritos and so on. Needless to say, the inland transportation mode is pipeline.

Generally hinterlands of domestic trade are very small and limited to the state just behind the port. The outward cargo of Tampico was distributed to various ports, which indicated that Tampico had the function of distributing petroleum and petrochemical products.

Fig. III-4-(1) shows the present hinterland of each port, based on the analysis of inland import cargo traffic of Table III-4-(14). In the Metropolitan area, the hinterlands of the four ports overlap.

Table III-4-(12) Foreign Countries to Tuxpan's Foreign Trade (1980)

Order	Imp.	Share (%)	Imp. Volume (1,000 tons)	Exp.	Share (%)	Exp. Volume (1,000 tons)
1	USA	83.9	461.8	West Germany	46.9	29.7
2	West Germany	16.1	88.4	USA	32.3	20.5
3				Belgium	19.2	12.1
4				Puerto Rico	1.6	1.0

(Source: SCT)

Table III-4-(13) Container Cargo Volume of Mexican Ports (1979, 1980)

Port	Year	Number of loaded containers		Size of container		Container cargo volume (tons)		Number of empty containers	
		Imp.	Exp.	20'	40'	Imp.	Exp.	Imp.	Exp.
Tampico	1979	424	986	1,227	183	5,804	12,584	18,388	50
	1980	1,582	1,156	2,382	386	17,817	10,667	28,484	1,120
Tuxpan	1979	5,956	1,257	7,213	191	87,418	17,790	105,208	3,122
	1980	8,505	2,382	10,887	288	123,765	43,723	167,488	3,626
Veracruz	1979	7,334	2,663	9,997	8,698	93,545	32,673	126,218	2,468
	1980	14,231	4,265	18,496	15,156	186,180	59,210	245,390	4,908
Coatzacoalcas	1979	10	3	13	13	23	8	31	-
	1980	517	271	788	213	1,684	3,589	5,273	486
Pto. Morelos	1979	60	-	60	-	1,154	-	1,154	-
	1980	-	194	196	41	-	2,670	2,670	-
Guaymas	1979	-	45	45	28	-	322	322	21
	1980	153	588	741	223	1,329	7,091	8,420	284
Manzanillo	1979	3,697	1,483	3,180	1,654	23,738	19,280	43,038	480
	1980	9	-	9	7	176	-	176	-
Lazaro Cardenas	1979	176	-	176	-	1,351	-	1,351	176
	1980	383	26	409	61	2,681	283	2,964	284
Total	1979	14,033	5,969	20,022	12,041	189,470	70,900	260,430	1,246
	1980	25,984	9,628	36,612	19,932	357,215	137,574	494,789	3,861

Notes: including transits containers (Source: SCT)

Table III-4-(14) Import Cargo Traffic (1975)

Inland Destinations (1,000 tons)					Overseas Origins (1,000 tons)				
State	Tampico	Tuxpan	Veracruz	Coatzacoalcos	Foreign Ports (Countries)	Tampico	Tuxpan	Veracruz	Coatzacoalcos
Agua Calientes	0.9 (0.0)	-	0.2 (0.0)	0.6 (0.0)	Brownsville (USA)	49.9 (3.0)	1.6 (0.3)	16.3 (1.0)	11.9 (1.7)
Baja Calif. N.	-	-	-	-	Corpus Christi (USA)	37.8 (2.3)	-	20.6 (1.4)	5.6 (0.8)
Baja Calif. S.	-	-	-	-	Houston (USA)	92.2 (5.6)	36.2 (5.8)	22.9 (1.5)	2.8 (0.4)
Campeche	23.6 (1.4)	-	0.1 (0.0)	11.0 (1.6)	New Orleans (USA)	106.7 (6.5)	6.1 (1.0)	254.5 (16.9)	160.7 (20.3)
Coahuila	-	-	-	-	Galveston (USA)	17.4 (1.1)	-	-	13.0 (1.9)
Colima	-	-	0.1 (0.0)	2.7 (0.4)	Other US ports	266.7 (16.2)	69.6 (11.2)	154.2 (10.2)	137.1 (19.8)
Chiapas	1.2 (0.0)	-	-	-	Canada	-	56.5 (9.1)	82.1 (5.5)	-
Chihuahua	759.0 (48.5)	18.4 (3.0)	1,098.7 (73.0)	70.2 (10.1)	France	-	-	28.3 (1.9)	1.0 (0.1)
D.F.	0.2 (0.0)	-	0.1 (0.0)	-	Holland	251.9 (17.9)	157.8 (25.3)	25.4 (1.7)	0.2 (0.0)
Durango	7.5 (0.5)	-	1.9 (0.1)	1.5 (0.2)	W. Germany	32.1 (1.9)	-	75.7 (5.0)	2.6 (0.4)
Guanajuato	-	-	-	24.5 (3.5)	Belgium	94.2 (5.7)	-	54.4 (3.0)	1.0 (0.1)
Guanajuato	0.7 (0.0)	-	59.2 (3.9)	11.3 (1.6)	England	11.3 (0.7)	24.9 (4.0)	20.4 (1.4)	0.6 (0.0)
Hidalgo	7.7 (0.5)	9.9 (1.6)	3.2 (0.2)	0.4 (0.0)	Italy	23.6 (1.4)	23.2 (3.7)	15.3 (1.0)	-
Jalisco	3.1 (0.2)	-	80.6 (5.4)	138.7 (20.0)	South America	254.1 (15.4)	197.9 (31.7)	376.7 (25.0)	350.2 (43.3)
México	0.8 (0.0)	-	0.8 (0.0)	-	Cuba	-	2.1 (0.3)	-	-
Michoacán	-	-	0.9 (0.0)	9.0 (1.3)	Japan	16.5 (1.0)	-	-	0.7 (0.0)
Morales	-	-	-	-	Other ports	350.8 (21.3)	48.2 (7.7)	358.2 (23.8)	76.2 (11.0)
Nayarit	26.4 (1.6)	-	16.6 (1.1)	-	Total	1,618.2 (100.0)	674.1 (100.0)	1,505.6 (100.0)	693.6 (100.0)
San Luis Potosí	0.2 (0.0)	36.8 (5.9)	0.2 (0.0)	19.0 (2.7)					
Sinaloa	5.0 (0.3)	-	0.2 (0.0)	0.3 (0.0)					
Sonora	-	-	-	-					
Tlaxcala	-	-	0.1 (0.0)	-					
Veracruz	13.1 (0.8)	-	0.7 (0.0)	-					
Yucatán	-	-	0.6 (0.0)	-					
Zacatecas	-	-	0.1 (0.0)	45.1 (6.5)					
Zacatecas	754.7 (45.8)	-	0.6 (0.0)	-					
Zacatecas	-	-	0.7 (0.0)	19.9 (2.9)					
Zacatecas	1.6 (0.0)	559.0 (89.5)	205.0 (13.6)	233.2 (33.6)					
Zacatecas	2.5 (0.2)	-	4.0 (0.3)	54.8 (7.9)					
Zacatecas	-	-	0.2 (0.0)	-					
Total	1,618.2 (100.0)	674.1 (100.0)	1,505.6 (100.0)	693.6 (100.0)					

Site (); 1
Source: SCT

Table III-4-(15) Export Cargo Traffic (1975)

Inland Origins (1,000 tons)					Overseas Destinations (1,000 tons)				
State	Tampico	Tuxpan	Veracruz	Coatzacoalcos	Foreign Ports (Countries)	Tampico	Tuxpan	Veracruz	Coatzacoalcos
Agua Calientes	-	-	-	-	Brownsville (USA)	473.6 (26.9)	-	-	32.9 (2.1)
Baja Calif. N.	-	-	-	-	Corpus Christi (USA)	-	-	17.8 (2.9)	-
Baja Calif. S.	-	-	-	-	Boston (USA)	17.3 (0.7)	15.8 (100.0)	81.3 (13.1)	-
Campeche	61.9 (3.5)	-	0.1 (0.0)	1.3 (0.0)	New Orleans (USA)	-	-	38.9 (6.2)	-
Coahuila	1.1 (0.0)	-	0.5 (0.0)	-	Galveston (USA)	-	-	17.6 (2.8)	-
Colima	0.6 (0.0)	-	0.8 (0.1)	28.9 (1.9)	Other US Ports	323.9 (18.4)	-	75.2 (12.1)	582.9 (63.3)
Chiapas	8.4 (0.5)	-	-	-	Canada	97.4 (5.5)	-	22.5 (3.6)	-
Chihuahua	36.0 (2.0)	-	47.0 (7.5)	-	France	19.8 (1.1)	-	19.1 (3.1)	20.5 (1.3)
D.F.	-	-	-	-	Holland	82.1 (4.7)	-	28.2 (4.5)	9.7 (0.6)
Durango	140.8 (8.0)	-	0.6 (0.1)	-	W. Germany	28.6 (1.6)	-	34.4 (5.5)	8.2 (0.5)
Guanajuato	7.0 (0.4)	-	-	-	Belgium	35.9 (2.0)	-	9.3 (1.5)	4.7 (0.3)
Guanajuato	159.8 (11.3)	-	2.9 (0.5)	-	England	-	-	8.8 (1.4)	111.5 (7.2)
Hidalgo	10.6 (0.6)	-	1.4 (0.2)	-	Italy	21.4 (1.2)	-	40.7 (6.5)	56.3 (3.6)
Jalisco	9.7 (0.6)	-	20.5 (3.3)	-	South America	20.4 (1.2)	-	34.3 (5.5)	97.8 (6.3)
México	10.6 (0.6)	-	0.6 (0.1)	-	Cuba	52.7 (3.0)	-	22.1 (3.5)	13.8 (0.9)
Michoacán	-	-	2.9 (0.5)	-	Japan	141.9 (8.1)	-	-	-
Morales	-	-	-	-	Other ports	452.3 (25.7)	-	172.5 (27.2)	213.5 (13.8)
Nayarit	232.3 (13.2)	-	1.3 (0.2)	-	Total	1,762.3 (100.0)	15.8 (100.0)	622.7 (100.0)	1,551.8 (100.0)
San Luis Potosí	0.3 (0.0)	-	0.1 (0.0)	-					
Sinaloa	312.7 (17.7)	-	-	-					
Sonora	-	-	-	-					
Tlaxcala	-	-	1.9 (0.3)	40.4 (2.6)					
Veracruz	651.1 (36.9)	-	-	-					
Yucatán	14.1 (0.8)	15.8 (100.0)	9.7 (1.6)	-					
Zacatecas	15.9 (0.9)	-	495.5 (80.2)	1,476.1 (95.1)					
Zacatecas	49.4 (2.8)	-	0.8 (0.1)	0.1 (0.0)					
Total	1,762.3 (100.0)	15.8 (100.0)	622.7 (100.0)	1,551.8 (100.0)					

Site (); 1
Source: SCT

Table III-4-(16) Inward Cargo Traffic (1975)

State	Inland Destinations (1,000 tons)			
	Tampico	Tuxpan	Veracruz	Coatzacoalcos
Aguascalientes	-	-	-	-
Baja Calif. S.	-	-	-	-
Baja Calif. S.	-	-	-	-
Campeche	-	-	-	-
Coahuila	-	-	-	-
Colima	-	-	-	-
Chiapas	-	-	-	-
Chihuahua	-	-	-	-
D.F.	21.1 (0.5)	-	77.0 (3.0)	-
Durango	-	-	-	-
Guanajuato	-	-	-	-
Guerrero	-	-	-	-
Hidalgo	-	-	-	-
Jalisco	-	-	-	-
Mexico	-	-	7.3 (0.3)	-
Michoacan	-	-	-	-
Nuevo Leon	-	-	-	-
Oaxaca	-	-	-	-
Puebla	-	-	7.3 (0.3)	-
Queretaro	-	-	-	-
Quintana Roo	-	-	-	-
S.L.P.	-	-	-	-
Sinaloa	-	-	-	-
Sonora	-	-	-	-
Tlaxcala	-	-	-	-
Veracruz	-	7,305.1 (100.0)	2,470.1 (95.4)	0.4 (0.4)
Yucatan	-	-	-	1.1 (1.0)
Zacates	-	-	-	-
Total	4,664.2 (100.0)	7,305.1 (100.0)	2,562.4 (100.0)	108.4 (100.0)

Mode	Transportation Mode (1)			
	Tampico	Tuxpan	Veracruz	Coatzacoalcos
Pipeline	99.1	99.9	95.7	79.2
Railway	0.3	0.1	3.6	5.6
Road	0.6	-	0.7	15.2

Port	Domestic Origins (1,000 tons)			
	Tampico	Tuxpan	Veracruz	Coatzacoalcos
Tuxpan	16.7 (0.4)	-	-	-
Veracruz	8.8 (0.2)	-	-	0.4 (0.4)
Tampico	-	279.5 (3.8)	850.0 (33.1)	106.8 (98.6)
Coatzacoalcos	4,377.5 (93.9)	2,182.5 (29.9)	1,277.9 (49.1)	-
Campeche	0.7 (0.0)	-	21.6 (0.8)	-
Minatitlan	251.3 (5.4)	165.8 (2.3)	320.2 (12.5)	-
Pajaritos	-	4,672.8 (64.0)	-	-
Ocean Platform	-	4.3 (0.0)	-	-
Other ports	9.2 (0.2)	0.2 (0.0)	92.7 (3.6)	1.1 (1.0)
Total	4,664.2 (100.0)	7,305.1 (100.0)	2,562.4 (100.0)	108.4 (100.0)

Note: (1); 2
(Source: SCT)

Table III-4-(17) Outward Cargo Traffic (1975)

State	Inland Origins (1,000 tons)			
	Tampico	Tuxpan	Veracruz	Coatzacoalcos
Aguascalientes	-	-	-	-
Baja Calif. S.	-	-	-	-
Baja Calif. S.	-	-	-	-
Campeche	-	-	-	-
Coahuila	-	-	-	-
Colima	-	-	-	-
Chiapas	-	-	-	-
Chihuahua	-	-	-	-
D.F.	-	-	0.8 (17.0)	-
Durango	-	-	-	-
Guanajuato	-	-	-	-
Guerrero	-	-	-	-
Hidalgo	-	-	-	-
Jalisco	-	-	-	-
Mexico	-	-	-	-
Michoacan	-	-	-	-
Nuevo Leon	-	-	-	-
Oaxaca	-	-	-	-
Puebla	-	-	-	-
Queretaro	-	-	-	-
Quintana Roo	-	-	-	-
S.L.P.	-	-	-	-
Sinaloa	-	-	-	-
Sonora	-	-	-	-
Tlaxcala	-	-	-	-
Veracruz	-	4.1 (100.0)	46.2 (83.0)	1.4 (100.0)
Yucatan	-	-	-	-
Zacates	-	-	-	-
Total	1,578.5 (100.0)	4.1 (100.0)	47.0 (100.0)	1.4 (100.0)

Mode	Transportation Mode (1)			
	Tampico	Tuxpan	Veracruz	Coatzacoalcos
Pipeline	88.2	-	87.6	-
Railway	11.7	-	5.8	-
Road	0.1	100.0	6.6	100.0

Ports	Domestic Destinations (1,000 tons)			
	Tampico	Tuxpan	Veracruz	Coatzacoalcos
Veracruz	823.8 (52.2)	-	-	-
Tuxpan	277.5 (17.6)	-	-	-
Minatitlan	186.9 (11.8)	-	-	-
Coatzacoalcos	91.2 (5.8)	-	40.9 (81.1)	-
Coahuila	53.2 (3.4)	-	-	-
Manzanillo	50.9 (3.2)	-	-	-
Campeche	46.6 (3.0)	-	-	-
Rosario	24.5 (1.5)	-	-	-
Nazatlan	18.3 (1.2)	-	-	-
Cozumel	4.1 (0.3)	-	5.5 (11.6)	-
Progreso	0.7 (0.0)	-	-	-
Tampico	-	-	0.3 (0.6)	1.1 (75.2)
Ocean Platform	-	4.0 (97.6)	-	-
Other ports	0.8 (0.0)	0.1 (2.4)	0.3 (0.7)	0.3 (21.8)
Total	1,578.5 (100.0)	4.1 (100.0)	47.0 (100.0)	1.4 (100.0)

Note: (1); 2
(Source: SCT)

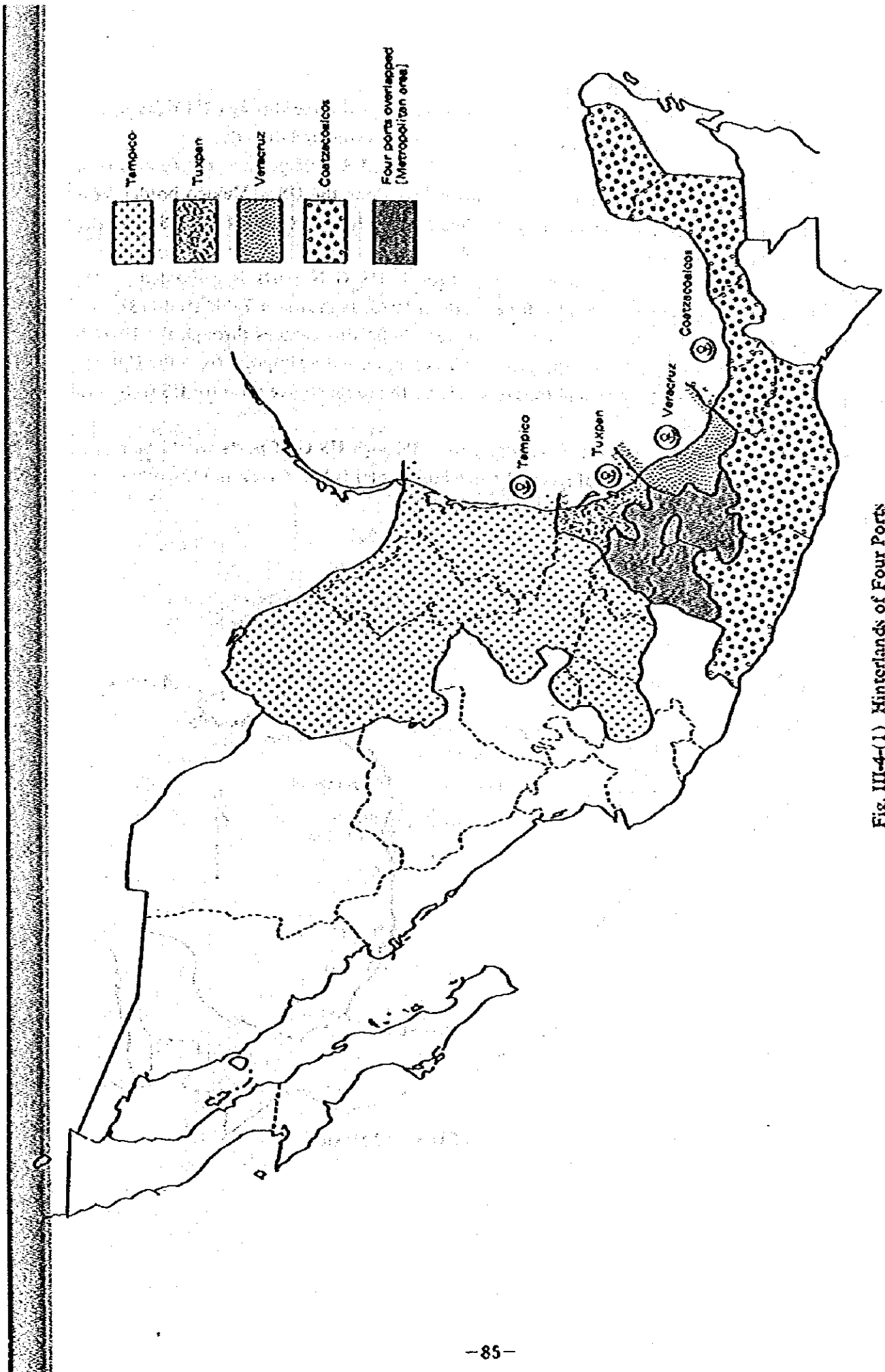


Fig. III-4-(1) Hinterlands of Four Ports

4-4 Cargo Traffic through US Gulf Ports

There are no data by which the import and export cargo volume through US Gulf ports – Houston, Galveston, Corpus Christi and Brownsville – can be estimated directly.

We define the import and export cargo volume through US Gulf ports as the foreign trade cargo volume which goes through the five customs points along the US – Mexico border – Cd. Acuna, Piedras Negras, Nuevo Laredo, Reynosa and Matamoros – excluding the US – Mexico trade cargo out of the total volume.

According to this definition, cargo volume through US Gulf ports is estimated as 418 thousand tons for imports and nearly zero for exports in 1978, as shown in Table III-4-(18).

We can assume some route choice is made between importing cargoes through the US Gulf ports and importing cargoes through Tampico and Tuxpan, excluding imports from the U.S. The latter cargo volume was 1,144 thousand tons in 1978. So the route choice ratio for US Gulf ports will be 27 percent.

The domestic destinations of the cargoes imported through US Gulf ports would be mostly two regions -- the first is the state of Nuevo Leon whose center is Monterrey and the other is the metropolitan area whose center is Mexico City.



Fig. III-4-(2) Gulf Coast of U.S. and Mexico

Table III-4(18) Estimation of Cargoes through US Gulf Ports (1978)

(Unit: 1,000 Tons)

	Imp.		Exp.	
	Imp. Total	Excluding US	Exp. Total	Excluding US
National Total	15,442.3	5,245.8	34,346.9	6,947.7
Cargoes through the US Mexico border	6,056.8	588.4	4,347.8	-
Matamoros	788.0	76.6	329.1	-
Reynosa	65.3	6.3	577.3	-
Nuevo Laredo	3,015.6	293.0	982.0	-
Piedras Negras	424.4	41.2	476.9	-
Cd. Acuna	5.3	0.5	111.3	-
Sub Total	4,298.6	417.6	2,476.6	-
Imp., Exp. Cargoes of Tampico and Tuxpan	1,900	1,144	2,125	1,246

Note: -; nearly zero

(Source: Anuario Estadístico del Comercio Exterior de los Unidos Mexicanas
SCT; Estadístico del Movimiento Portuario Nacional de Carga y Bouques)

5. Present Situation of Port of Tuxpan

5-1 Administration and Operation

Tuxpan Port has, in addition to public port facilities, four single mooring buoys and several wharves owned and operated by PEMEX and TECOMAR S.A.

The public port facilities, water area, and other facilities are under the authority of three local branches of Secretaria de Comunicaciones y Transportes ("SCT") of the central government.

Therefore, the local branches are not independent port authorities, but are under the control of higher ranking offices for personnel and financial management, etc. Also, they are not directly connected with local government bodies.

The local branches, as administrators of the port, supervise cargo handling, repair and maintenance of port facilities, collection of port dues and charges, port security, preparation of port statistics, etc.

Water and oil supply services are not in operation at Tuxpan Port. The main tasks handled by each branch are shown in Fig. III-5-(1). The local branches conduct smooth administration and operation at Tuxpan Port through the adjustment of their tasks.

The local branches do not employ a corporate accounting system for their financial administration, but budget control is implemented every fiscal year and its record of income and expense is reported every month to a higher ranking office of the SCT.

At Tuxpan Port, there is also a fishery port, which is under the control of the Tuxpan Port office PESCA of the central government.

(1) Organization

Fig. III-5-(1) is an organizational chart of port and harbor related offices, including both those of the SCT and the local branches.

The local branches do not directly employ dock workers. The total number of its personnel is sixty eight.

At Tuxpan Port, five pilots are available. They are not personnel of the SCT, but are members of a pilot union.

(2) Cargo handling

On the basis of service contracts with shipping companies, cargo handling is carried out under the supervision of the Operacion Portuaria, by a stevedoring union (TESORERIA-Sindicato Unico de Alijadores, Estibadores y Trabajadores Similares y Conexos de la Barra Sur y la Victoria del Puerto de Tuxpan). Cargo handling is done in three shifts. TESORERIA organizes one hundred-twenty union members and one hundred-eighty nonmembers, and belongs to Confederación de Trabajadores de Mexico ("CTM"), a national organization.

Cargo handled at the port is transported by private trucking companies.

(3) Port charges

The main port charges in effect at present at Tuxpan are summarized in the following table: Table III-5-(1):

Table III-5-(1) Main Port Charges

Kinds	Application
Port due	Tariff x per GRT by ship
Dockage	Tariff x hour x per meter
Wharfage	Tariff x cargo ton
Mooring charge	Tariff per ship
Cargo handling charge	Tariff x cargo ton or unit
Towage*	Tariff x per hour
Pilotage	Tariff x per GRT by ship

*Note: The local branches do not have any tugboats; towing is carried out by PEMEX's tugboats on a rental basis.

(Source: General Tariff of Tuxpan Port)

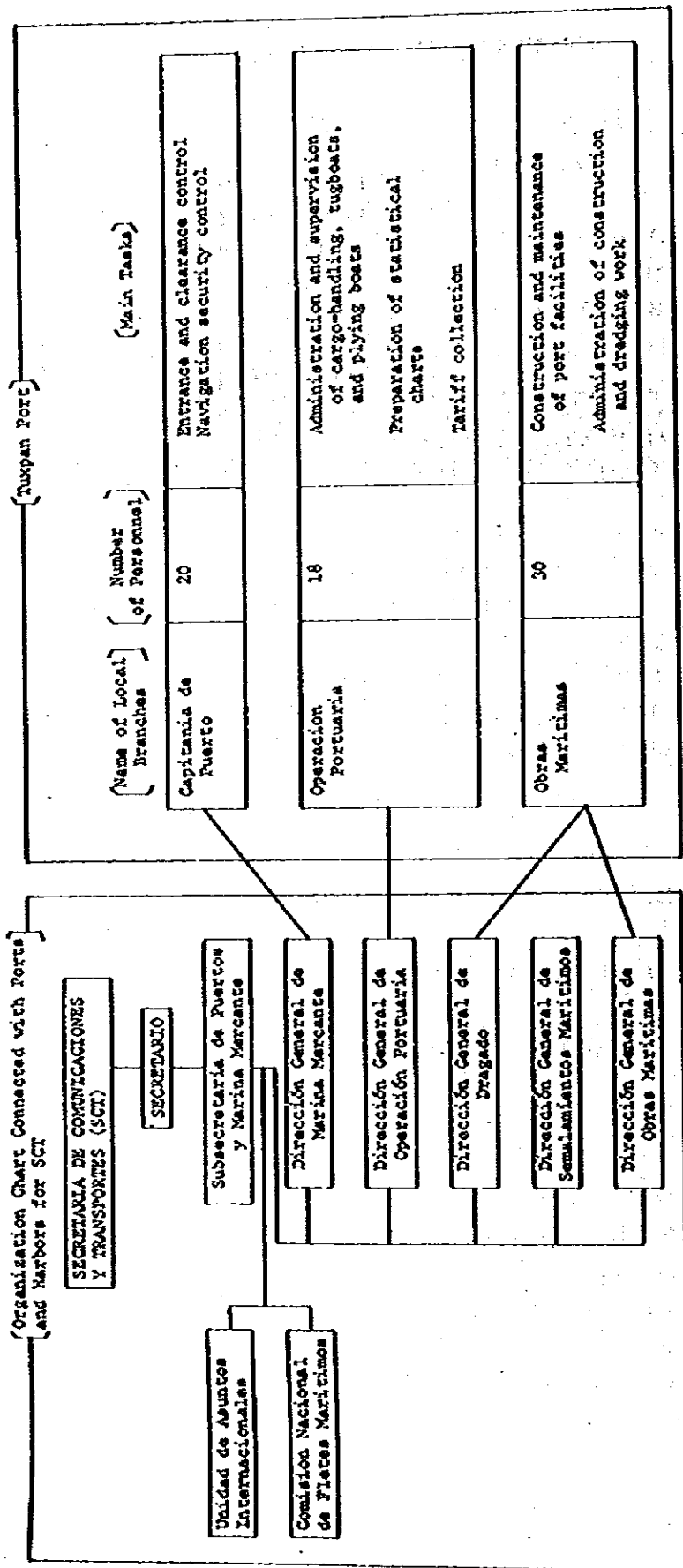


Fig. III-5-(1) Organization Chart of Tuxpan-Local Branches (As of August, 1982)

5-2 Port Facilities

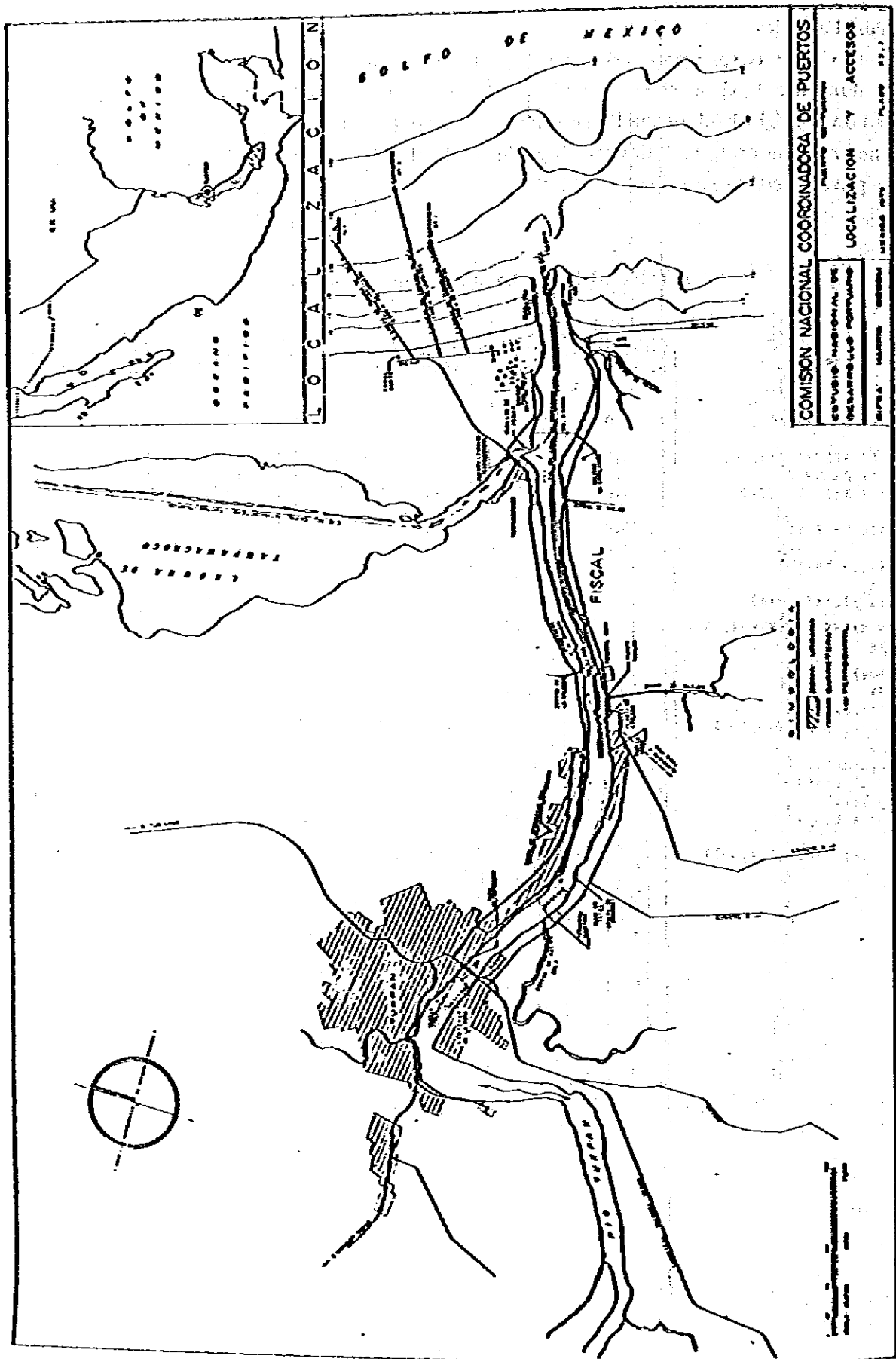
The existing Tuxpan port is shown in Fig. III-5-(2). Mooring facilities are located in the three zones along the Tuxpan River; around the estuary, at Cobos and at Tuxpan bridge. Cobos is located on the right bank of the River, midway between the estuary and Tuxpan bridge.

The main mooring facilities are listed in Table III-5-(2). There are five public berths and eleven private berths excepting buoy berths.

Table III-5-(2) Existing Mooring Facilities

Berth	Water depth of berth	Length of berth	Apron width	Crown height	Surcharge (t/m ²)	(Units: m)	
						Location	Year Constructed (year)
(Public berth) MUELLE DE MERCADOS	3.0	100	4	1.3	1.0	lefthand side	1976
MUELLE FISCAL ANTIGUO	4.5	60	13	2.5	1.5	"	1933
MUELLE DE DRAGA	1.0	42	5	2.5	1.0	"	1978
MUELLE FISCAL NUEVO	6.0	150	13	2.5	3.0	rightband side	1976
MUELLE DE PESCA	3.0	138	9	2.5	1.5	"	1976
(Private berth) FENEX (para plataformas)		3 x 80				rightband side	
TERMINALES MARITIMAS, S.A. FENEX		30 80				"	
(Cobos) FENEX		50				"	
(Etilco) TECOMAR, S.A. (P.O. RO.) FENEX		30 3 x 40				"	
(Yazpaschoco) CLUB OF PESCA		150				lefthand side	
Booy berth (single booy)		(5)				offshore	

(Source: SCT (Tuxpan))



COMISION NACIONAL COORDINADORA DE PUERTOS
 INSTITUTO NACIONAL DE ESTADISTICA Y GEOGRAFIA
LOCALIZACION Y ACCESOS
 ESCALA: 1:50,000
 FECHA: 1960
 MAPA 27.7

FIG. 27-5-(2) RIVERINA TUXTEPEC PORT

Two main channels are found. The first has a minimum depth of 8 m, an 80 m wide width and is 1,350 m long, being used as an approach channel from the open sea, and the other has a minimum depth of 7 m, a 60 m width and is 5,650 m long, lying in the middle of the Tuxpan river. The anchorage basin is located in the sea, the size of which is 2,000 m in maximum diameter and 3.14 million m².

The cargo handling volume at the wharves, which was 38,212 tons in 1970, excepting petroleum, is shown in Table III-5-(3). The occupancy rate of the "Fiscal" wharves was high even in 1970. However, this table, it should be noted, excludes the data of newly constructed wharves built after 1970.

Table III-5-(3) Cargo Handling by Wharf

Wharf	No. of ships	Cargo Volume (ton)		Period of Service (day)	Occupancy Rate (%)
Terminal maritima	18	Chemical products	6,640	45	0.13
		General cargo	1,070		
		General cargo	3,668		
Tampamachoco	515	-	25,690	373	0.20
Fiscal	226	General cargo	874	97	0.27
Total	759		38,212	515	

Note: Based on the data in 1970
(Source: SCT)

5-3 Land Use -

General land use in the existing Tuxpan port is shown in Fig. III-5-(3).

As already mentioned, the port functions of the existing Tuxpan port are concentrated in the three areas of Area I, II and III. These areas have the specific functions respectively as follows.

Area I - Handling of general cargo, handling of fish, mooring of fishing boats and other kinds of ships

Area II - Handling of container cargo, handling of chemical and petrochemical products

Area III - Handling of chemical and petrochemical products

The area to the right side of the Tuxpan River sees little use, and is utilized as a pasture. However there are a lot of marshlands with no human use. In spite of having a long unutilized water line, the area to the left side of the River is not appropriate for large-scale industrial development, because most of the land is already in use for example the oil base of PEMEX, the estuary of Tampamachoco lagoon, the existing airport, the existing Tuxpan urban zone and so on.

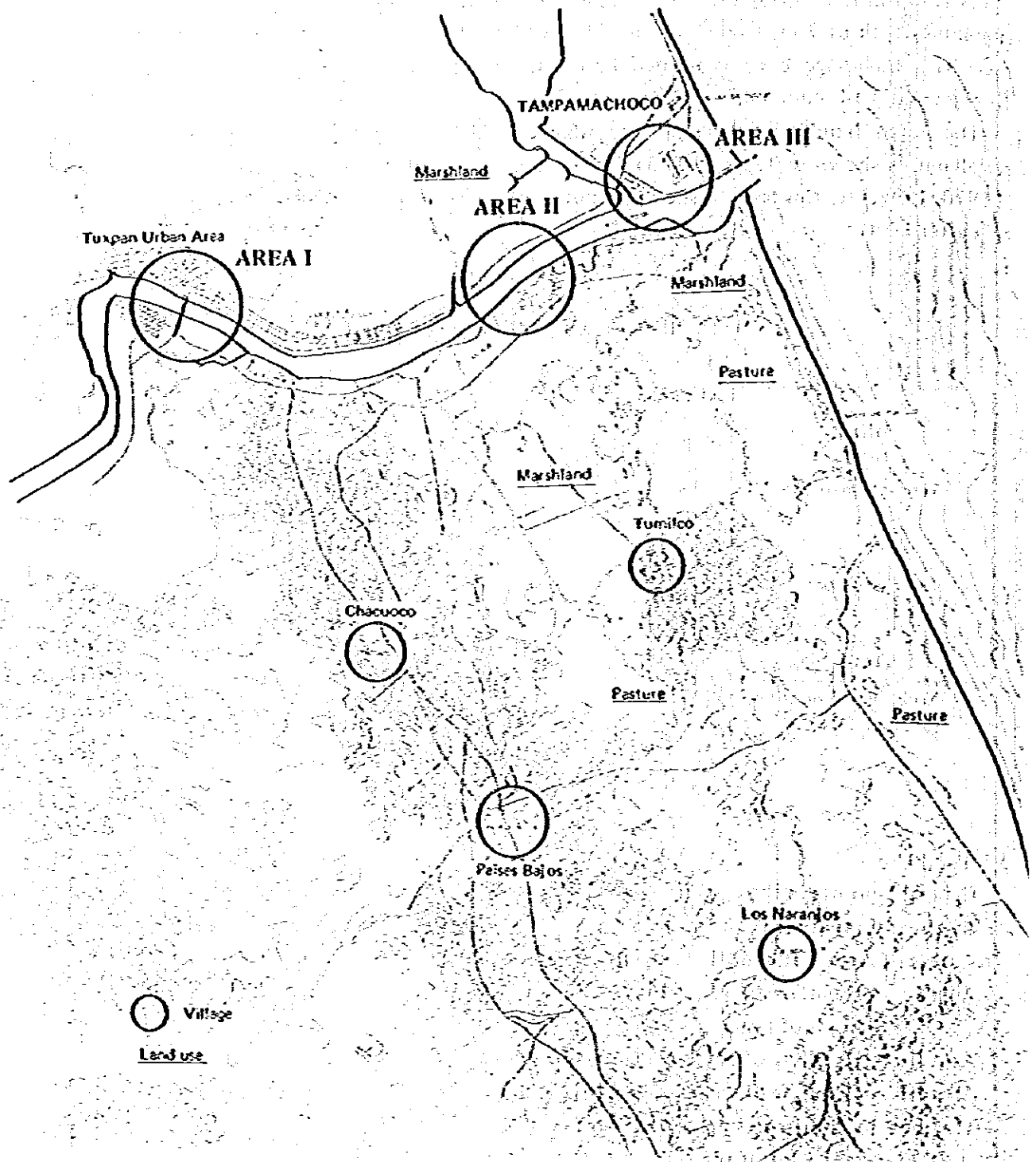
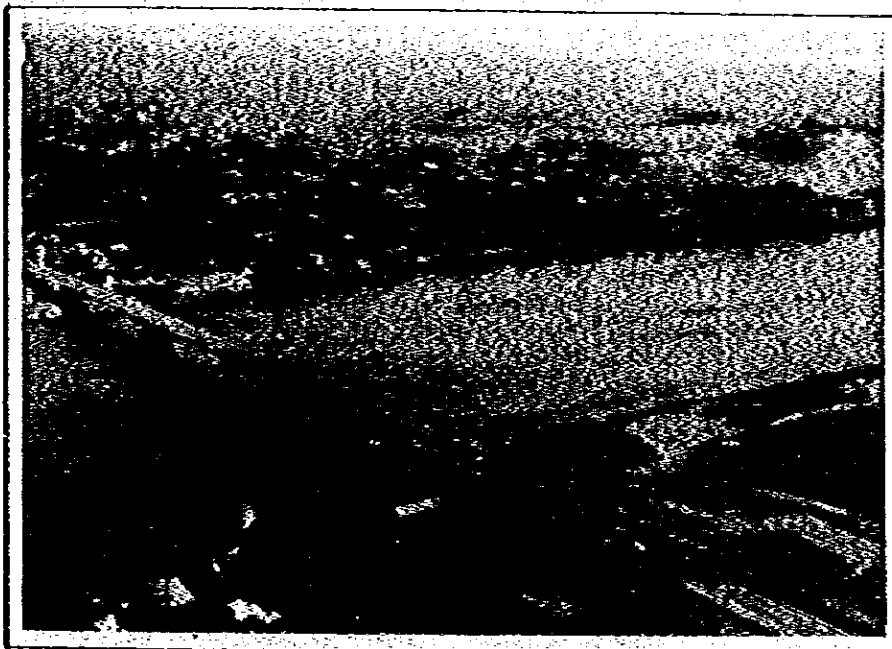


Fig. III-5-(3) Land Use in Existing Tuxpan Port

CHAPTER IV

FUTURE OF THE DEVELOPMENT AREA



The River of Tuxpan and Tuxpan City

CHAPTER IV. FUTURE OF THE DEVELOPMENT AREA

I. Socio-Economic Frame

II Arrangement of the Subjects

Based on the analysis of the present conditions in Chapter III, the characteristics and problems of the Area can be extracted, and the subjects for the future are arranged, as shown in Table IV-1-(1).

Table IV-1-(1) Arrangement of the Subjects

Fields		Characteristics of Present Conditions	Subjects for Future
Natural Condition	Topography	<ul style="list-style-type: none"> *many undulating zones of 100-200 meters above sea level *few bottlenecks on the land use 	
	Meteorology	<ul style="list-style-type: none"> *attack of the hurricanes 	<ul style="list-style-type: none"> *disaster-prevention from the hurricanes
Socio-Economic Condition	Agriculture & stock farming	<ul style="list-style-type: none"> *advantageous topographic conditions *stagnant activities for recent years 	<ul style="list-style-type: none"> *promotion of the development of agriculture and stock farming
	Fishery	<ul style="list-style-type: none"> *small fishery production *advantageous fishery resources in the Gulf (shrimp, tuna, oyster etc.) 	<ul style="list-style-type: none"> *promotion of the improvement of fishery ports and fishing boats
	Industry	<ul style="list-style-type: none"> *only petrochemical industry in Poza Rica 	<ul style="list-style-type: none"> *location of diverse types of industry *composition of industrial core zones
	Commerce & services	<ul style="list-style-type: none"> *small accumulation 	<ul style="list-style-type: none"> *location of diverse types of commerce and services *composition of large core zones in accordance with industry
	Tourism	<ul style="list-style-type: none"> *few tourism resources and activities 	<ul style="list-style-type: none"> *study of the possibility for the marine recreational base
	Urban function	<ul style="list-style-type: none"> *few accumulations of urban functions 	<ul style="list-style-type: none"> *creation of attractive regional environments on the basis of proper allotment of urban functions
	Transportation	<ul style="list-style-type: none"> *poor transportation network 	<ul style="list-style-type: none"> *rapid composition of good transportation network (airport, port, railway and road)

From the macroscopic view, it can be said that this area has two principal subjects. The one is rapid industrialization for the dynamic evolution of the Area, and the other is accumulation of various kinds of urban functions for the creation of attractive regional environments.

1-2 Population Frame

The population of the Area was 730 thousand persons in 1980, and is assumed to be 1.05 million persons in 1988 and 1.57 million persons in 2000, considering projected population increases due to the Chicontepec development and Tuxpan industrial development, as shown in Table IV-1-(2).

The annual growth rate of population will be 4.7 percent from 1980 to 1988 and 3.4 percent from 1988 to 2000.

Table IV-1-(2) Population Frame (1988, 2000)

(Unit: 1,000 Persons)

	1950	1960	1970	1980	1988	2000	annual growth rate (%)		
							1970/ 1980	1980/ 1988	1988/ 2000
Mexico	25,791	34,923	48,225	67,382	84,190	100,249	3.4	2.8	1.5
Veracruz State	2,040	2,728	3,815	5,264	7,070	9,500	3.3	3.8	2.5
Development Area	243.8	377.2	567.3	729.6	1,051.1	1,574.3	2.5	4.7	3.4
Ratio to Veracruz State (%)	12.0	13.8	14.9	13.9	14.9	16.2	—	—	—

Note: Mexico and Veracruz State are based on the Mexico Demografico, Breviario 1979 - 1980.

The population reached by natural increase will be 1.14 million persons in 2000 and the rest of population in 2000 will be 0.43 million persons, which will be called development population or incoming population (Fig. IV-1-(1)).

Population distribution in the Area is estimated by consideration for the sub-regional population increase caused by the new projects - Tuxpan industrial development, Chicontepec crude oil development and Chicontepec regional development.

The sub-regional population increase is estimated in the following process.

Step 1. To estimate the direct employees of the three projects

Tuxpan Industrial development 43 thousand employees

Chicontepec crude oil development 26 thousand employees

Chicontepec regional development 54 thousand employees

Step 2. To estimate the indirect employees of the three projects, and calculate the total employees by summing up the results of Step 1 and Step 2.

Step 3. To estimate the total population increase by division of the total employees by employment ratio, which is assumed to grow to 33 percent in 2000 from 25 percent in 1970. This drastic change will be caused by the expected remarkable increase of the working population.

Step 4. To assign the population increase to the sub-region by consideration for project areas. These assignments are as follows.

- Tuxpan industrial development Tuxpan Municipio
- Chicontepepec crude oil development Poza Rica Municipio
- Chicontepepec regional development Temapache Municipio

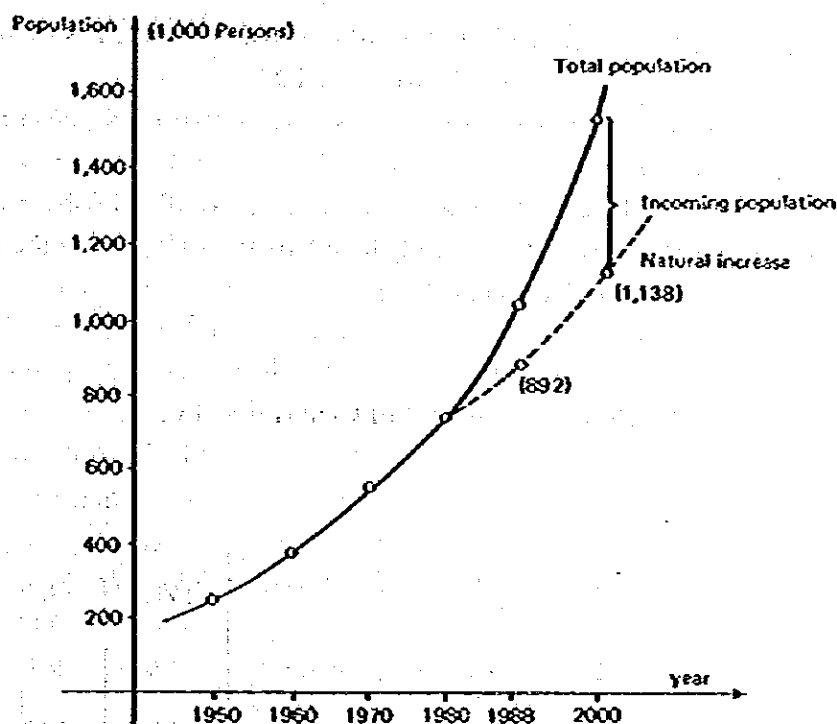


Fig. IV-1-(1) Population Frame

The results of population distribution are as follows, however, the population of other "municipios" is assumed to stay at the same level as in 1980.

Municipio	Population in 2000 (1,000 persons)
Tuxpan	514.8
Poza Rica	439.1
Temapache	230.9
Other "Municipios"	389.5
Total	1,574.3

1-3 Industrial Frame

The GDP and industrial production are selected as the indices for the industrial frame.

In this study, the results of PNDI* (project case and trend case) may be used as basic national economic growth model.

(1) Project case

The economic growth rate from 1980 to 1982 in Plan Global de Desarrollo is assumed as follows.

1980 8%

1981 8.8%

1982 9%

And the economic growth rate from 1983 to 1990 in PNDI is assumed as follows.

1983 - 1990 10%

The economic growth rate from 1990 to 2000 is assumed to be 8 percent, foreseeing the slight slowdown of the economy.

National GDP is estimated by the above growth rates, and GDPs of Veracruz State and the Area are estimated so that the per-capita GDPs of these two areas may reach the national level in 2000, as shown in Table IV-1-(3) and Table IV-1-(4).

Table IV-1-(3) Forecast of GDP (Project Case)

(Unit: 1970 Billion Pesos)

	1970	1980	1988	2000	Annual growth rate (%)		
					1970/ 1980	1980/ 1988	1988/ 2000
Mexico	444.3	841.9	1,769.8	4,623.8	6.6	9.7	8.3
Veracruz State	35.3	51.7	110.8	425.5	3.9	10.0	11.9
Development Area	5.2	6.9	15.9	71.0	3.0	11.0	13.3
Ratio to Veracruz State (%)	14.7	13.3	14.4	16.7	-	-	-

Table IV-1-(4) Forecast of Per-capita GDP (Project Case)

(Unit: 1970 Thousand Pesos)

	1970	1980	1988	2000	Annual growth rate (%)		
					1970/ 1980	1980/ 1988	1988/ 2000
Mexico	9.21	12.49	21.02	46.12	3.1	6.7	6.8
Veracruz State	9.25	9.82	15.72	44.79	0.6	6.0	9.1
Development Area	9.10	9.48	15.11	45.10	0.4	6.0	9.5

Industrial production is estimated basically by using the elasticity to GDP. The actual elasticity from 1970 to 1980 was 1.45, and this value is assumed to continue till 1988. From 1988 to 2000, elasticity will become a little smaller because of the increase of industrial added value, and is assumed to be 1.20.

But the industrial production of the Area is estimated from the industrial productivity (industrial production per total employees) and the total employees. The industrial productivity grew at the annual growth rate of 4 percent from 1970 to 1980 in Veracruz State. This growth rate is assumed to continue till 2000.

The results are shown in Table IV-1-(5).

Table IV-1-(5) Forecast of Industrial Production (Project Case)

(Unit: 1970 Billion Pesos)

	1970	1975	1980	1988	2000	Annual growth rate (%)		
						1970/ 1980	1980/ 1988	1988/ 2000
Mexico	212.4	278.3	531.7	1,527.4	4,793.6	9.6	14.1	10.0
Veracruz State	8.7	11.3	21.4	63.2	314.2	9.4	14.5	14.3
Development Area	—	0.22	0.41	4.55	31.32	—	35.1	17.4
Ratio to Veracruz State (%)	—	2.0	1.9	7.2	10.0	—	—	—

Note: Excluding extraction and refinery of petroleum and basic petrochemical industry.

(2) Trend case

In Chap. I-4, GDP was calculated using actual economic growth rate from 1981, 1982 and projected ones from 1983 to 1988 in the National Development Plan. In this section, GDP, per-capita GDP, industrial production in the Area are calculated by use of GDP under the new economic plan.

Table IV-1-(6) Forecast of GDP (Trend Case)

(Unit: 1970 Billion Pesos)

	1970	1980	1988	2000	Annual growth rate (%)		
					1970/ 1980	1980/ 1988	1988/ 2000
Mexico	444.3	841.9	1,085	2,669	6.6	3.2	7.8
Veracruz State	35.3	51.7	85.0	247	3.9	6.4	9.3
Development Area	5.2	6.9	12.6	40.9	3.0	7.8	10.3
Ratio to Veracruz State (%)	14.9	13.3	14.8	16.6	—	—	—

Table IV-1-(7) Forecast of Per-capita GDP (Trend Case)

(Unit: 1970 Thousand Pesos)

	1970	1980	1988	2000	Annual growth rate (%)		
					1970/ 1980	1980/ 1988	1988/ 2000
Mexico	9.21	12.49	12.89	26.62	3.1	0.4	6.2
Veracruz State	9.25	9.82	12.02	26.0	0.6	2.6	6.6
Development Area	9.10	9.48	15.0	26.0	0.4	3.0	6.7

Table IV-1-(8) Forecast of Industrial Production (Trend Case)

(Unit: 1970 Billion Pesos)

	1970	1975	1980	1988	2000	Annual growth rate (%)		
						1970/ 1980	1980/ 1988	1988/ 2000
Mexico	212.4	278.3	531.7	762	2,240	9.6	4.6	9.4
Veracruz State	8.7	11.3	21.4	43.6	156	9.4	9.3	11.2
Develop- ment Area	—	0.22	0.41	1.96	14.4	—	21.7	18.1
Ratio to Veracruz State (%)	—	2.0	1.9	4.5	9.2	—	—	—

Note: Excluding extraction and refinery of petroleum and basic petrochemical industry.

2. Future Image of Main Cities

2-1 Comprehensive Regional Development of Chicontepec

The Chicontepec basin has an area of 11,300 km² with an average width of 45 km and a south-to-north length of about 260 km. The basin includes an enormous amount of possible petroleum development area as shown in Fig. IV-2-(1). According to the survey conducted by PEMEX for the past several years, this area extends for a length of about 123 km with an average width of about 25 km in a total area of 3,300 km², with the deposit of hydrocarbons estimated at 106 billion barrels of which the utilizable volume is 17.6 billion barrels. This is an enormous volume, corresponding to 24 percent of the confirmed deposit of hydrocarbons in the country (72 billion barrels) as of September 1981. This oil field's features are as follows: The oil layer is located at a relatively shallow depth of 1,800 m under the surface and no random factor is involved so that the probability of obtaining oil is high wherever excavation is made.

PEMEX has conducted the survey for this development including the point of view of regional development. But, as this development is closely related to the development of Tuxpan Industrial Port, the Government of Mexico has decided to carry out the study on this development by forming a governmental committee. The committee is formulating a comprehensive regional development plan from the view-point of not only the petroleum development but also the development of agriculture, industry, water resources, flood control, transport and infrastructures.

As already described in Chapter II-2, the future of the Area is closely related with the Chicontepec petroleum development. An area of about 2,000 km² which overlaps with the petroleum development is entirely subject to the influence of the petroleum development.

Therefore, taking into account the fact that the Chicontepec project is a comprehensive regional development project, the time and place of starting the petroleum development should be determined in order to balance regional development. Particularly, supply of temporary houses during the development period and provisions of related urban facilities should be determined upon a long range view extending beyond the petroleum development.

2-2 Basic Course of the Regional Development

- 1) The area will be developed with the development of Tuxpan industrial port and Chicontepec project as a momentum, therefore, the attractive regional sphere of life should be established in the Area.
- 2) In accordance with the policy of industrial dispersion based on the National Industrial Development Plan, the industrial development in the Area should be the keynote. But, in order to secure employment and regional development of the Area, the industries organically connected with the comprehensive Chicontepec regional development should be deployed diversely.
- 3) To realize the foregoing direction, positive efforts should be made for accumulation of the urban functions related to the industrial and living foundations, distributing the urban functions appropriately to the respective districts in the Area and to the development of a traffic network in the Area including airports, ports, railways and roads.
- 4) In such regional development, special consideration should be given to protection of the

comfortable environment, harmony with the primary industries such as agriculture, forestry, stock-farming and fisheries and prevention of natural disasters.

2.3 Future Image of Main Cities

(1) Priority plan

Development projects of railways, roads and cities are shown in Table IV-2-(1) and IV-2-(2). Under the projects, it should be noted that the road between Tuxpan and Poza Rica is to be increased four lanes and that the Tihuatlan-Alamo-Alazan road is to be improved. The railway project has its execution delayed, but, anyway, Veracruz and Altamira will be connected along the Gulf so that the railway will run near Tuxpan, and this is significant for formation of the traffic network. The new urban project of Alamo and Poza Rica to be developed along with the comprehensive regional development of Chicontepec is also worthy of note because of the scale of its magnitude.

**Table IV-2-(1) Roads/Railways Construction Project
(concerning the development area)**

	Section	Distance (km)
Road	1 Construction	
	Huejutla - Benito Juárez - Alamo	122
	Tamazunchale - Huejutla	52
	Huayacocotla - Benito Juárez	69
	Metzquititlan - Huayacocotla	20
	2 Improvement	
	Tihuatlan - Alamo - Alazan (Route VER-127)	57
	Tuxpan - Ozuama - Tampico (Route MEX-180)	185
Poza Rica - Nautla (Route MEX-180)	90	
Tulancingo - Poza Rica - Tuxpan (4 lanes) (Route MEX-130)	212	
Railway	1 Construction	
	Veracruz - Cardel - Quabrache - Chicoy - Tampico (1980-1982)	400

Source: Proyecto Chicontepec - Tuxpan, Programa De Construction y Modernization De La Infraestructura Ferroviaria 1979 - 1982

Table IV-2-(2) New Town Project

Location	No. of Households	Development Area (ha)	Target year	Remark
1) Alamo	3,500	Industrial Park - 500 Commercial Area - 100	1985	The name of the new town - Chapopote Núñez
2) Poza Rica	3,500	Industrial Park - 500 Commercial Area - 100	1985	

(2) Future image of main cities

When the future of the main municipios in the Area is stated according to the foregoing basic courses, their future image may be depicted as below.

(a) Tuxpan:

- 1) Comprehensive city with the large scale coastal industrial complex
- 2) Central city in the Area, having regional control functions
- 3) City having a distribution business and marine recreational functions
- 4) Central city of an attractive regional sphere of life, having facilities of higher level for arts, culture, information, science, etc. (marine research institute, university, general hospital, etc.).

(b) Poza Rica:

- 1) Inland industrial city and central city of the Chicontepec petroleum development
- 2) Distribution business center
- 3) Central city in conjunction with Coatzacoatlán and Papanatla in the southern part of the development area.

(c) Alamo:

- 1) Inland light industrial city
- 2) Strategic base for regional development in conjunction with Tuxpan and Poza Rica.

(d) Papanatla:

- 1) Development of agro industry
- 2) Agriculturally productive city, due to effective use of farm land.

(3) Future transport network

(a) Road

In the priority plan, the development and improvement of the routes Tuxpan-Poza Rica, Tihuatlan-Alamo-Alazan, Poza Rica-Nautla and Tuxpan-Ozuluama-Tampico are particularly important for integral development and prosperity of the Area. Further, considering that the relation between the Area and Mexico D.F., Tampico and Veracruz will intensify with progress of industrialization in future and that the three strategic municipios of Tuxpan, Poza Rica and Alamo will form a golden triangular zone of the development area, it is proposed to construct an expressway between Tuxpan and Alamo, Poza Rica and Mexico D.F. and an expressway along the Gulf by way of Tuxpan and also, to reinforce the road network, a trunk road between Alamo and Chicontepec. Estimating upon the cargo volume generated in the future, there will be need for an expressway of four lanes between Poza Rica and Mexico D.F. and one of two lanes between Alamo and Chicontepec.

(b) Railway

Construction of the railway line between Veracruz and Tampico under the priority plan should be started as soon as possible. Further, in consideration of the modal split in Mexico and the fact that the cost of railway transport is generally lower than that of the road transport when the transport distance is over 300 km, it is desirable to transport a part of the cargoes generated in the Tuxpan industrial port by railway. Thus, in this report, it is proposed to construct a railway line between Tuxpan and Mexico D.F. (See Section I, Chapter VII).

(c) Airport

In consideration of the forecast for business demand and sightseeing in Tuxpan and of the increasing use of aircraft in Mexico, it is proposed to construct an airport connected with Mexico D.F. in Tuxpan.

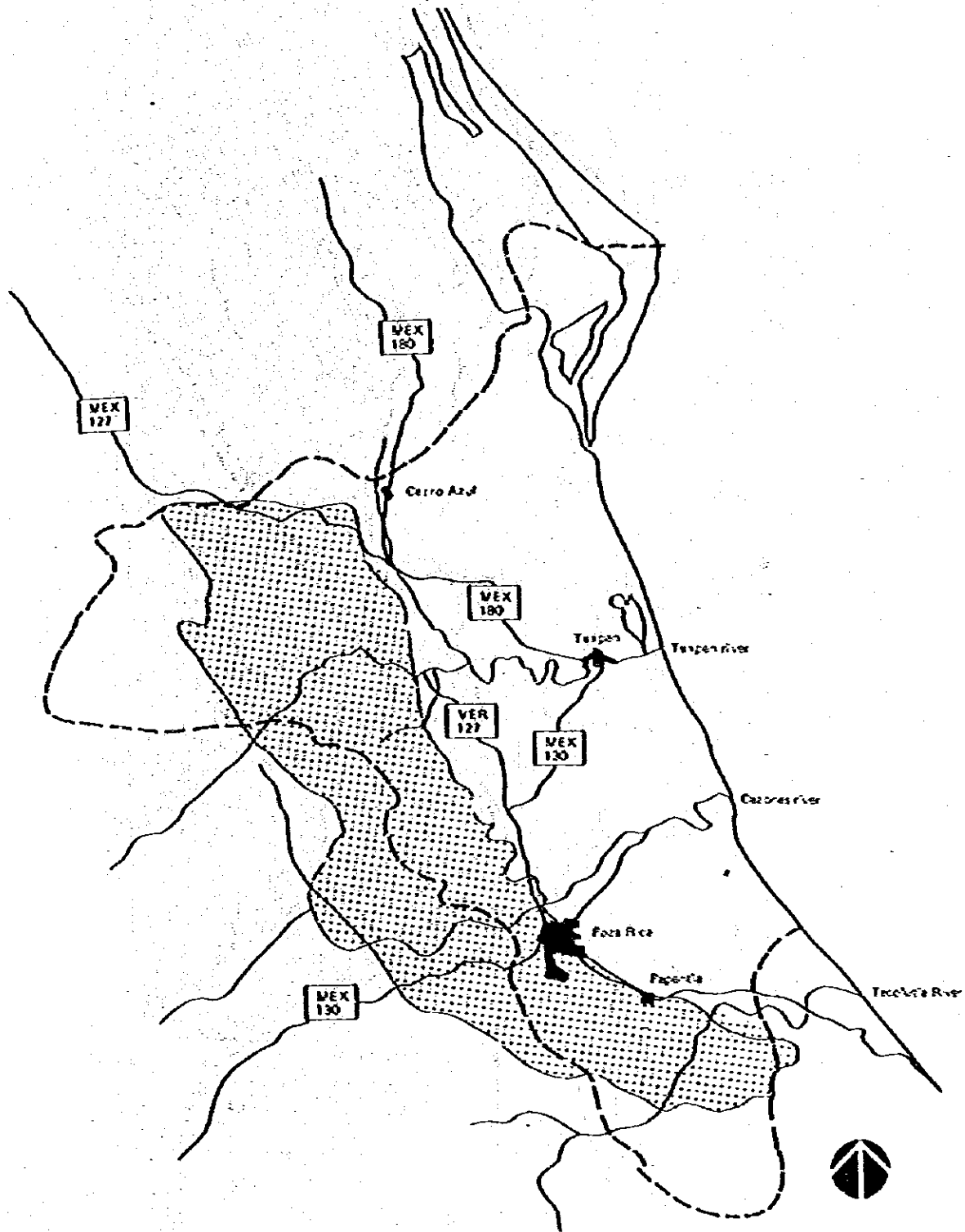


Fig. IV-2-(1) Chicontepec Petroleum Development Area

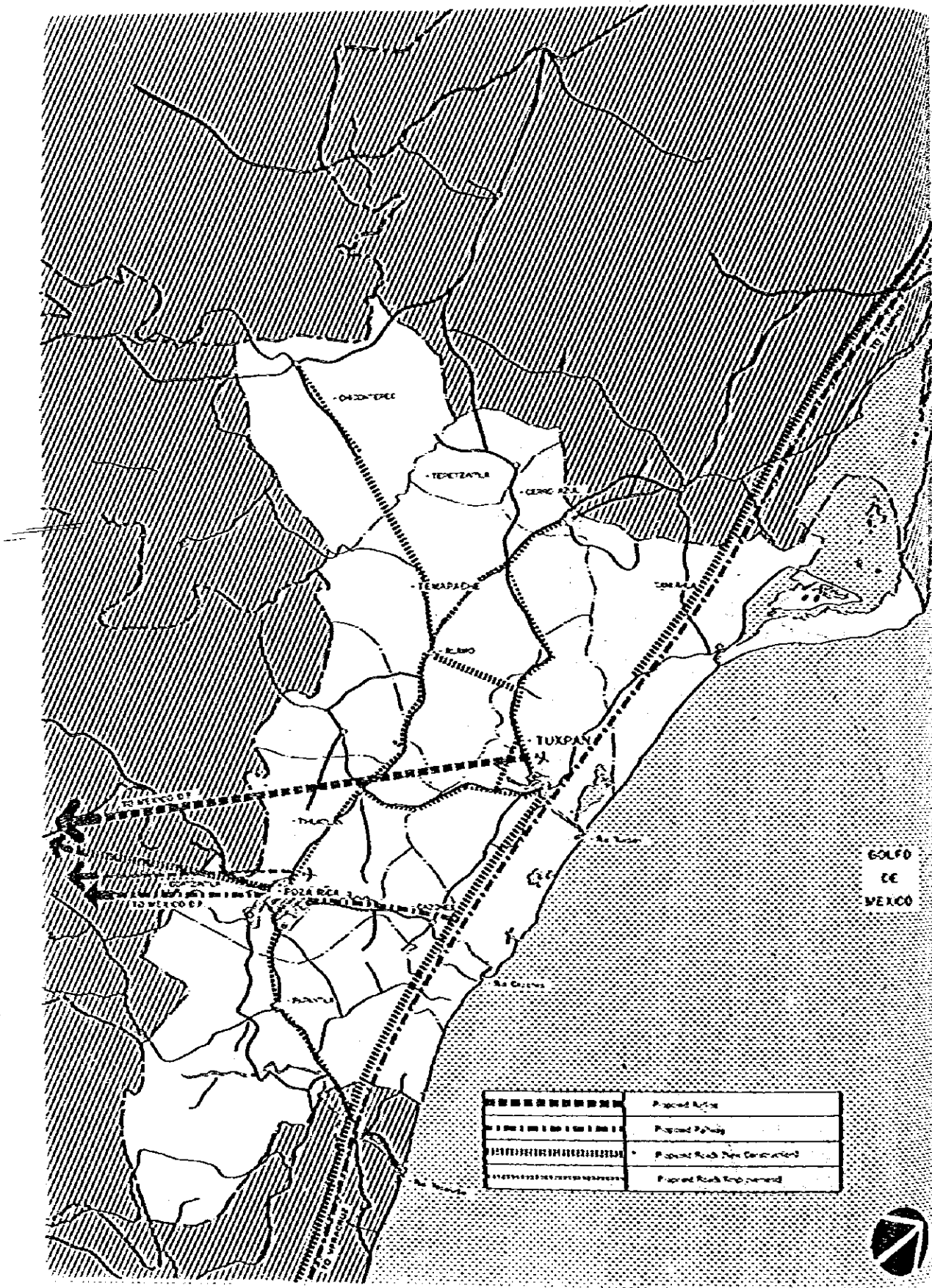


Fig. IV-2(2) Planned Traffic Network